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REVIEW ARTICLES

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DISEASES CAUSED BY BACTERIA AND FUNGI

MINETT, F. C. (1944.) **I. The problem of equine strangles in India. II. Climatic factors as related to the incidence of equine strangles in India.**—*Indian J. vet. Sci.* **14.** 1–12 & 75–94. **2298**

I. M. discusses strangles, as it occurred in 1914–42 at the Army Remount Depots of Mona and Sargodha (Punjab) and at the stud farms of Probynabad, Coleyana, Renala (Punjab) and Ahmednagar (Bombay).

At Mona and Sargodha the annual incidence among horses scarcely fell below 50%, the mean annual percentages for 1917–40 at Mona and for 1927–40 at Sargodha being 76·2 and 72·6 respectively. The incidence of strangles among mules at these stations was definitely lower, with mean annual rates of 53·2% and 46·8% respectively. At the stud farms the yearly incidence varied from nil to 50%. At both depots and stud farms a high strangles mortality rate occurred with some regularity every four or five years; among horses at Mona it varied from nil to 8·5% (mean 5·0%) and at Sargodha from 3·5% to 10·1% (mean 6·1%), while at the stud farms the variation in the rate was considerable (mean 6·1%). Deaths were most frequent in yearlings. In mules the mortality rate was only about 1%. Admission for strangles treatment was highest in animals 10–12 months old.

An account is given of the methods ordinarily practised at the depots and stud farms in dealing with young horse populations, and the epidemiological principles involved in the control of the disease at the remount depots are discussed.

II. The climatic factors, temperature, rainfall, relative humidity, wind velocity and dust storms were considered. In the Punjab, as also at Ahmednagar where the climate is more equable, the attack rate is higher in the cold season than in the hot and is lowest in the summer rainy season. Monsoon conditions are definitely unfavourable for the spread of the disease, which has no clear connexion with the relative humidity or with the wind velocity. Dust storms are frequent in the Punjab from May to August and the weather conditions responsible for these storms may lead to a secondary rise in the attack rate during May and June.

A low minimum temperature may be responsible for initiating outbreaks, but the disease may continue in spite of an improvement in the weather. Conditions at the depots are complicated by the fact that susceptible animals accumulate in great numbers during the autumn and winter.—S. SEN.

IYER, P. R. K. (1944.) **Tuberculosis in buffaloes.**—*Indian J. vet. Sci.* **14.** 100–105. **2299**

Literature on TB. in buffaloes is reviewed. Since information on the types of tubercle bacilli in buffaloes is meagre, an investigation on abattoir material was conducted in the United Provinces, Bombay and Bengal. Of buffaloes examined at random in abattoirs, 6 out of 250 in Izatnagar, 16 out of 120 in Bombay and 3 out of 130 in Calcutta were affected with TB. The lesions, calcified in 15 cases, were confined to the lungs and thoracic lymph nodes. Thirteen strains of *Mycobacterium tuberculosis* were isolated. They were typically dysgonic, excepting one which grew equally on plain and glycerinated egg media. Cultural and biological examination of the 2nd and 3rd generation cultures showed them to be of bovine type. It is pointed out that the data collected do not represent the broad incidence of the disease since many of the buffaloes were slaughtered as being obviously diseased.—G. L. S.

RATTI, P. (1944.) Die Bekämpfung der Rindertuberkulose im Bergell. **[Control of bovine TB. in Bergell.]**—*Schweiz. Arch. Tierheilk.* **86.** 161–162. **2300**

In the few herds tested by the ophthalmic test, which was in use until 1937, the incidence of infection was not high. In 1937, the single intradermal test was introduced, skin measurements and a consideration of the nature of the reaction being depended upon in interpretation of the test, and all reactors being slaughtered. At first the work was confined to a small number of herds but in 1940 all the farms in the area agreed to join the scheme. The area concerned was an isolated one and quarantine restrictions controlled the entrance of new cattle into the area. In 1940–41, 3·4% of the 1,941 cattle in 216 herds proved to be infected. In 1941–42, only 0·13% were reactors and in 1942–43, none reacted to the test. At the time of writing, the 1943–44 tests had not been completed but so far no reactors had been found.—M. C.

I. —. (1944.) Baden. Verordnung des Ministers des Innern über die Bekämpfung der Rindertuberkulose. **[Germany : order concerning control of bovine TB. in Baden.]**—*Reichsgesundheitsblatt.* **19.** 149–152. **2301**

II. —. (1944.) Baden. Runderlass des Ministers des Innern, betr. Bekämpfung der Rindertuberkulose. **[Germany : circular concerning the control of bovine TB. in Baden.]**—*Ibid.* 146–149. **2302**

I. This plan for the control of bovine TB. in Baden relied upon eradication by areas, the unit being the parish (*Gemeinde*), and upon the intradermal tuberculin test supported by clinical and bacteriological examination. The tuberculin test was to be applied to all cattle over eight weeks of age and all tested cattle had to be identified by ear tags; particulars of the tuberculin and criteria for the judgment of the test are not given. Positive reactors were to be slaughtered, pending which they were subject to police supervision

and had to be kept in isolation, but might sometimes be transferred to other infected herds.

Farmers who conformed to the regulations and possessed "clean" herds could apply for official recognition. In areas in which more than one-quarter of the herd owners were enrolled in the scheme, all bulls had to be tuberculin tested and reactors kept separate from non-reactors, *i.e.*, "clean" cows could only be served by "clean" bulls; where two-thirds of all the herds are "clean" the remainder can be compelled to participate in the scheme.

The tuberculosis-free designation was obtained after two tuberculin tests at an interval of at least eight weeks and could only be retained by an undertaking to bring in cattle only from a "clean" herd or cattle which had given negative reactions at two tests.

Cattle of herds free from TB. could not use community pastures or be sent to any kind of bovine gathering, and milk products obtained from collecting dairies had to be heat-treated before use by such cattle. These herds had to pass a clinical examination and tuberculin test once a year; if new reactors were found they had either to be slaughtered or sent to herds not "clean" and not used for breeding. Clinically suspect animals had to be isolated and examined bacteriologically and all those slaughtered had to be examined after death and the results reported. Herds in which reactors had been found had to be retested with tuberculin not less than eight weeks after removal of the reactors.

Persons infected with TB. were forbidden to tend "clean" herds.

The owner was compensated for cattle slaughtered under the order, there being three categories of compensation based on productiveness, up to 75, 100 and 125 RM. respectively. There was a premium of 2 pfennigs a litre on the price of milk from "clean" herds, but this was withdrawn if tuberculin reactors were found and was only renewed on reinstatement. Provision for State financing of the scheme was also mentioned.

II. This circular gave further instructions relating to the order. Details of special importance were as follows. Tuberculin tests were interpreted solely by official veterinarians but the injections need not be made by them. [Presumably this meant that private practitioners and perhaps others could execute the tests.] Bull owners were supplied with lists of "clean" herds. Costs allowed to veterinary surgeons included 0·50 RM. per inspection per head, in easily accessible herds, or 1·0 RM. in single herds remote from others enrolled in the scheme, and 2·0 RM. for the collection of material sent for laboratory examination. Herd owners contributed to the *Landratsamt* 5 RM. per head per examination. Other points in the circular concern administration and record keeping, etc.—J. E.

FAULDS, J. S. (1945.) **Tracing the source of infection in cases of tuberculous meningitis of bovine origin.** —*Mon. Bull. Min. Hlth Emerg. publ. Hlth Lab. Serv.* **4.** 69–70. **2303**

F.'s interest in this work was aroused about ten years ago by the death of a child from tuberculous meningitis. The child had apparently had nothing but T.T. milk since infancy and, on examination, the herd was found to be free of clinical evidence of infection, whilst a checked sample of milk was also negative. A sample of milk taken in the course of delivery was, however, positive. It was found that the producer-retailer, unable to produce sufficient milk for his requirements, was buying accommodation milk from a local pool of surplus milk which, in normal circumstances, was sent for manufacturing purposes. He had been purchasing it unpasteurized and selling it as T.T.

Since then F. has made a practice, during the last ten years, of attempting to trace, with the assistance of the veterinary officials of the Ministry of Agriculture, the source of infection in those cases which, upon autopsy, revealed tuberculous meningitis and in which the source of infection was alimentary.

Although there have been numerous failures, six cases have been found where the herd supplying milk to the household contained a tuberculous cow. The latest case was in a four-year-old child who received milk from a herd of 30 cows in which there was one cow with TB. of the udder; a sample of the milk of this animal contained a large number of tubercle bacilli. —H. E. BYWATER.

*GOUGEROT, H., & LAPORTE, R. (1943.) Etude de l'hypersensibilité de l'homme tuberculeux aux paratuberculines et aux protéides des bacilles acido-résistants saprophytes. **[Study of hypersensitivity of tuberculous human beings to "paratuberculins" and proteins of saprophytic acid-fast bacilli.]**—*Bull. Acad. Méd. Paris.* **127.** 88. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 78–79.] **2340**

In a study of paratuberculins prepared from filtrates of suitable "paratuberculous" organisms on Sauton's medium, the authors found that there was a close similarity in the type of intradermal reaction induced in tuberculous human patients by paratuberculins and tuberculins respectively when given at the same dose. In general, the former were less potent, since 15–200 times the amount of protein fraction of the saprophytic acid-fast bacilli were usually required to produce a reaction equal in intensity to that induced by tuberculo-protein. Nevertheless, about 10% of tuberculous subjects were as sensitive to paratuberculin as they were to tuberculin; at the other extreme, a small number were almost insensitive to the former.

Large doses of paratuberculin given subcutaneously may provoke a febrile response and inflammatory reaction in superficial tuberculous lesions. This property can be utilized to induce desensitization by repeated subcutaneous inoculations of suitable doses which may be spaced at much closer intervals than is possible with tuberculin without causing general or focal reactions. This desensitization is only partial in regard to tuberculin: the latter can produce a state of anergy not only against itself, but against all paratuberculins. —R. E. GLOVER.

BABLET, J., & VAN DEINSE, F. (1942.) Lésions anatomiques et histologiques consécutives à l'inoculation médiastinale de bacilles de Koch. **[Macroscopic and microscopic lesions due to inoculation of tubercle bacilli into the mediastinum of guinea pigs.]**—*C. R. Soc. Biol. Paris.* **136.** 705–706. **2305**

Following the mediastinal inoculation of *Mycobacterium tuberculosis* into g. pigs, an early and inflammatory reaction occurs. The irritative reactions of the pleura and pericardium are followed by a more or less abundant effusion, which in the case of the pleura is nearly always a transudate and not an exudate. Microscopically, the local reaction is of an intense exudative type. In these local lesions follicle formation and true caseous necrosis are never seen, and giant cells are seen but rarely. Generalization in the lung, liver and spleen is early and constant. The surface of the lung is covered with the exudate usual in mediastinal lesions; it is also very haemorrhagic. The pleural reaction is generally little marked. There is no desquamation or hyperplasia of the epithelial lining.—H. I. FIELD.

*ARIMA, R., AOYAMA, K., & OHNAWA, J. (1942.) Eigenart, Bedeutung und Dauer der AO-Immunität bei Tuberkulose. **[Value of AO vaccine in TB.**

immunization.]—*Beitr. Klin. Tuberk.* **97.** 293–308. [Abst. from abst. in *Bull. Inst. Pasteur.* **41.** 282.] **2306**

By the addition of saponin to the culture medium, the authors obtained a culture of *Mycobacterium tuberculosis* type S, very low in fats and lipoids. In consequence, the organisms readily gave up their soluble products in a watery suspension. By keeping an aqueous suspension of these organisms on ice for two years, autolysis of the organisms was effected. The solution obtained contained all the immunological substances of the bacilli and constituted the AO vaccine. The preparation is almost free of allergy-producing substances. It is stated that it stimulates both antibody and antitoxin production and can therefore be used as a preventive and curative in human TB. In experiments on a large scale in school children, certain social groups and even whole villages in Japan, encouraging results have been obtained and it is said that an immunity to TB. lasting several years is obtained.—H. I. FIELD.

*HOLMGREN, I. (1941.) Des tumeurs provoquées par des injections de BCG. [**Permanent local swellings caused at the site of inoculation of BCG.**]—*Acta med. scand.* **108.** 132–150. [In French.] [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 77.] **2307**

Non-suppurating, painless swellings developed in six out of 114 patients receiving subcutaneous injections of BCG in the thigh in doses varying from 0·25–1·0 mg. The reactions persisted for several years. In one case biopsy revealed a granuloma which was not typically tuberculous and was free from visible acid-fast bacilli. —R. E. GLOVER.

*WESSEL, E. (1942.) Uebermikroskopische Beobachtungen an Tuberkelbazillen vom Typus humanus. [**Examination of human type** *Mycobacterium tuberculosis* **with the electron microscope.**]—*Z. Tuberk.* **88.** 22–36. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 67.] **2308**

Examinations of human, avian and bovine tubercle bacilli have been made with the electron microscope. Vacuoles, granules and microgranules can be distinguished in the human type, being more apparent in older cultures, while in very old cultures the bacilli appear as empty sacs, having lost their morphological characters and their substance. Two types of granules are distinguishable, those resisting electronic radiations and others which seem to disappear under the influence of these radiations. Certain images give the impression that the resistant granules can leave the bacillary body and behave like spores.—H. I. FIELD.

STEWART, J., MCCALLUM, J. W., & TAYLOR, A. W. (1945.) **Observations on the blood picture of Johne's disease in sheep and cattle with special reference to the magnesium content of the blood.**—*J. comp. Path.* **55.** 45–48. **2309**

With one or two exceptions, blood samples from 19 sheep and 9 cows affected with Johne's disease yielded normal values for sugar, non-protein nitrogen, and chloride contents. The exceptions were probably due to emaciation and debility, which lower the blood sugar and cause an abnormal chloride content. All the haemoglobin values tended to be low, varying in sheep from 5·4 to 11·0 g. % (normal, 11·2 ± 1·1 g. %) and in cattle from 7·3 to 11·8 g. % (normal, 9·5 ± 1·4). The greatest variation in blood constituents in both cattle and sheep was observed in the blood Ca and Mg values. The variation from the normal was usually much greater for Mg than for Ca. The Mg values varied in sheep from 1·39 to 2·5 mg. % (normal, 2·65 ± 0·21 mg. %) and in cattle from 1·52 to 2·61 mg. % (normal 2·98 ± 0·28 mg. %).

It is suggested that the lowering of the Mg content of the blood may be a useful criterion in the diagnosis of Johne's disease in sheep and cattle.—A. B. PATERSON.

TAYLOR, A. W. (1945.) **Ovine paratuberculosis (Johne's disease of sheep).**—*J. comp. Path.* **55.** 41–44. **2310**

Johne's disease in sheep is often of sporadic occurrence, animals of three years of age and over being chiefly affected. The symptoms are those of severe debility, with loss of condition, loosening of the wool, emaciation and usually death in 2–3 months. Diarrhoea is an inconstant symptom, but may be present intermittently. Diagnosis is difficult, as typical *Mycobacterium johnei* may not be present in the faeces in large enough numbers to warrant positive diagnosis, and testing with avian tuberculin and johnin is of doubtful value.

The major lesions found on P.M. examination are confined to the intestine and mesenteric lymph nodes. The latter are oedematous and enlarged and the intestinal wall is thickened, usually in the posterior ileum, but nearly the whole of the small and large bowel may be involved. Corrugation may or may not be present but is never as marked as in cattle. The mucous membrane of the bowel is bile-stained. Smears from the affected bowel show enormous numbers of acid-fast organisms.

Material from 15 affected sheep from 11 infected farms, after treatment with antiformin or 5% oxalic acid, was sown on to Minett's medium [*V. B.* **12.** 569], containing whole egg and liver extract, 4% glycerine, 1% heat-killed *M. phlei* and gentian violet. The dye can be omitted and numerous modifications have been tried, *e.g.*, the use of egg yolk in place of whole egg, the addition of serum and/or potato extract, of tuberculin, or of finely minced sheep bowel in place of *M. phlei.* Normal growth of *M. johnei* was obtained in only four cases, while in the remaining 11 cases, growth either did not occur or was only evident as an increase in organisms in stained smears after 12–16 months' incubation. Prolongation of incubation up to 24 months gave no further increase.

Johne's disease in sheep appears to be caused by either the classical *M. johnei*, or a closely related organism, which can only be differentiated by its resistance to artificial cultivation and which may be termed *M. johnei* (ovine type).—ALEX. B. PATERSON.

BRAY, J. (1944.) **The phosphatase reaction as an aid in the classification of the Corynebacteria.**—*J. Path. Bact.* **56.** 497–506. **2311**

Corynebacterium diphtheriae, in contrast with many diphtheroids, produces no phosphatase and hence no hydrolysis of a medium containing phenolphthalein phosphate, and this property has been utilized to differentiate it from many of the common diphtheroids isolated from human sources. Since Barratt's classification of these diphtheroids by fermentation reactions is at variance with the cultural characteristics of these strains it was decided to study the phosphatase reaction more fully in order to try to secure a more satisfactory basis of classification. These studies were carried out in conjunction with morphological investigations and fermentation tests and a tentative new classification is proposed, although its limitations are recognized. —A. EDEN.

MÉRIEUX, C. (1942.) Transmission du rouget à l'homme. [**Infection of human beings with** *Erysipelothrix rhusiopathiae* **from animals.**]—Lyons : Mongraphe de la Société des Sciences Veterinaires. **2312**

In the course of a special enquiry made by the veterinary society at Lyons, 36 cases of infection with *E. rhusiopathiae* were discovered in human beings. Of

these, 14 were veterinary surgeons, 18 pig breeders, 1 a slaughter house employee, 1 a pork butcher and 2 ordinary butchers.

The infection in man is nearly always cutaneous, generalization being rare. Incubation is short, lasting only 24–48 hours and lesions are usually confined to the dorsal aspect of the fingers or hands and give a sensation of itching and burning; occasionally there is slight lymphangitis and adenitis of the arm.

Rapid treatment is essential to avoid complications such as arthritis, and to shorten the duration. Specific serotherapy is the best treatment, although serum shock, often severe, is seen quite frequently. [EVERTS (*V. B.* **12.** 73) reported 18 cases of serum shock out of 48 cases treated with serum.] M. reports good results following the local application of a dressing composed of equal parts of antiserum and lanoline, combined with the daily administration *per os* of 30 ml. antiserum. [For penicillin treatment of this infection, see abst. 2459.]
—R. M. LOOSMORE.

*KARLOVIĆ, J. (1942.) **[Is there a relationship between *Erysipelothrix rhusiopathiae* and *E. muriseptica*?]**—*Vet. Arhiv.* p. 421. [Abst. from abst. in *Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* Oct. 29th. 379. (1943).] **2313**

K. concludes that the two organisms are immunologically identical.—R. M. LOOSMORE.

RAJAGOPALAN, V. R., & SANKARANARAYANAN, N. S. (1944.) **A case of pseudotuberculosis (*Pasteurella pseudotuberculosis* infection) in the goat.**—*Indian J. vet. Sci.* **14.** 34–36. **2314**

The authors state that this appears to be the second case of *Past. pseudotuberculosis* infection reported in goats in India. The animal was affected with fever, and died after 17 days; there were symptoms of pneumonia and progressive emaciation. On P.M. examination greyish-white nodules, the size of millet seeds, were found on the liver and lungs. The lesions were granulomatous, but there was no club formation. The mediastinal, portal and mesenteric lymph nodes were not caseated.

Pure cultures of *Pasteurella pseudotuberculosis*, identified mainly on a biochemical basis, were obtained from the spleen, liver, lungs and some of the enlarged lymph nodes. Four goats and two rabbits injected with a broth culture of the organism, died of pneumonia within 20 days.—M. ISRAIL.

OLSUF'EV, N. G. (1940.) **[Role of *Stomoxys calcitrans* in transmission and perpetuation of tularaemia infection.]**—*Arkh. biol. Nauk.* **58.** No. 1. 25–31. [In Russian: English summary.] **2315**

Stomoxys calcitrans can transmit tularaemia mechanically from infected water voles (*Arvicola amphibius*) to g. pigs. Transmission was successful in 15% of the experiments and occurred from 40 min. to 24 hours, but not later, after feeding on infected voles. The infection, as judged by hypodermal injection into mice, could be detected in the insects and their excreta for 8½ and 5 days respectively after feeding on infected hosts.

This insect is considered less important than mosquitoes and tabanids as a tularaemia vector.—L. L.

OLSUF'EV, N. G. (1940.) **[Role of ectoparasites in the dissemination of tularaemia in central U.S.S.R.]**—*Arkh. biol. Nauk.* **60.** No. 2. 42–55. [In Russian.] [See also *V. B.* **10.** 411.] **2316**

O. gives a short survey of the literature and a general discussion of results obtained during 1938–39 in central U.S.S.R.

Adults and nymphs of *Dermacentor pictus* Herm. and *Ixodes ricinus*, as well as other species of this family, can transmit the disease amongst rodents and the incidence of the disease could be correlated with the numbers of ticks. It has yet to be shown that either fleas or mites of the family Gamasidae can actually transmit the disease in nature. Lice can transmit tularaemia among rats and mice, particularly under conditions where their hosts are crowded, *e.g.* in hay stacks.

Of the blood-sucking Diptera, 26 species of tabanids, 14 species of mosquitoes, and *Stomoxys calcitrans* can act as tularaemia vectors.—L. LEVENBOOK.

DOROFEEV, K. A. (1940.) O nekotorykh antigennykh razlichiyakh mezhdu vozbuditelyami tulyaremii i brutselleza. **[Antigenic differences between *Pasteurella tularensis* and brucella.]**—*Veterinariya, Moscow.* No. 5. pp. 42–47. [French summary.] **2317**

In 27·7% of cases, sheep sera gave positive agglutination reactions with both *Past. tularensis* and brucella antigens. It is therefore suggested that both antigens be employed in diagnosing tularaemia in sheep. Data are presented showing that such sera display both qualitative and quantitative differences, which may be studied by noting the difference in time and degree of the agglu. reaction with different dilutions of antigen.
—L. LEVENBOOK.

OLITZKI, L., & KOCH, P. K. (1945.) **The role of pathogenicity-enhancing substances in mice infected with Shigella dysenteriae (Shiga) and other Enterobacteriaceae.**—*J. Immunol.* **50.** 229–235. [Authors' summary copied *verbatim*.] **2318**

Two mucin preparations of different origin showed different degrees of effectiveness in enhancing the pathogenicity of intraabdominally injected *S. dysenteriae*.

Fractionation of these mucins showed that the active mucin (N) contained more of an insoluble fraction rich in inorganic substance, mostly aluminum, than did the less effective preparation W. Kaolin, as well as other inert adsorbing powders, activates some carbohydrates. Agar showed a weak pathogenicity-enhancing effect, but was activated by kaolin and other adsorbing powders. Levan itself, as well as carbohydrate fractions (M1) from mucin, showed marked effects, which were enhanced by kaolin. Glycogen and starch were inactive and were not activated by kaolin. The activity of the pathogenicity-enhancing substances was inversely proportional to the rapidity of their elimination from the abdominal cavity. Kaolin and other adsorbing substances retard elimination. Injection of bacteria with kaolin or with agar preceded or followed by an injection of an adsorbent had the same effect as a combined injection of the two substances.

The following properties are important for the effect of pathogenicity-enhancing substances: long persistence in the abdominal cavity, ability to adsorb and destroy white cells and, as a consequence, to prevent phagocytosis. The effect is, therefore, not an enhancement of pathogenicity but a depression of the mechanism of natural resistance.

MORDOVIN, S. V. (1940.) Toksoparatifin dlya prizhiznennoĭ diagnostiki paratifa porosyat. **[Allergic diagnosis of piglet paratyphoid with "toxoparatyphine".]**—*Veterinariya, Moscow.* No. 5. pp. 17–22. [French summary.] **2319**

From pure cultures of *Salmonella cholerae-suis*, M. prepared a "toxoparatyphine" which produces a specific reaction in piglets with acute or chronic paratyphoid. Healthy animals, or those with swine fever, swine erysipelas, swine pox, or enzootic pneumonia, do not react. "Toxoparatyphine" retains its properties for up to 1½ years.

Doses of 0·2–0·4 ml. are injected intradermally into the ear. Depending upon the severity of the disease, a reaction is produced in 2–8 hours, varying from a

blister the size of a pea, to hyperaemia with resulting thickening of the skin. This is diagnosed by palpation. Paratyphoid-infected piglets that have reached the stage of dermal cyanosis, do not give a positive reaction.
—L. LEVENBOOK.

STUART, C. A., & RUSTIGIAN, R. (1944.) **Strains of *Salmonella cholerae-suis* producing acetylmethylcarbinol.**—*J. Bact.* **48.** 498. 2320

The authors give a short note on five strains of *S. cholerae-suis* which, when first isolated, were strongly positive to the Voges-Proskauer test. On being retested 2–4 weeks after isolation, all five strains were either negative or very weakly positive to the V-P reaction.
—ANTHONY BUXTON.

FISHBEIN, V. Y. (1940.) Stabilizatsiya emul'sii termoagglyutiniruyushchikhsya kul'tur Brucella. **[Stabilization of thermoagglutinable cultures of brucella.]**—*Veterinariya, Moscow.* No. 5. pp. 48–52. [French summary.] 2321

"R" forms of cultures of *Brucella abortus*, thermoagglutinable in physiological saline solution of pH 6·2–6·8, lose this property on raising the pH to 7·4–7·6, or on adding anticoagulants, *e.g.*, sugar or citrate. This property was utilized to control dissociation of cultures used in the preparation of abortin.—L. LEVENBOOK.

MCLEOD, D. H. (1944.) **The use of thionine blue for the identification of *Brucella abortus* strain 19.**—*J. comp. Path.* **54.** 248–252. 2322

Thionine blue is used as a means of distinguishing *Brucella abortus* from both *Br. melitensis* and *Br. suis*, but some strains of *Br. abortus* may be as resistant as the other two species. The author found that strain 19 is more sensitive to thionine blue than other strains of *Br. abortus* and suggests the use of the dye as a means of identifying it. The strains are tested on solid medium in petri dishes containing various concentrations of thionine blue. Fresh cultures of the same age suspended in sterile tap water are rubbed on to about 1 sq. cm. of the medium; numerous strains can be tested on the same plate. Control plates are included. Bacto-tryptose agar has been found a very suitable medium. The use of an inoculum of about 50 organisms has been found advisable, as when strain 19 has been maintained in subculture for any length of time the use of a heavy inoculum increases the concentration of dye at which growth can occur. The differential bacteriostatic ratio (calculated by dividing the highest concentration of dye permitting the growth of other strains by that permitting the growth of strain 19) has never fallen below 8 : 1. No other strain of *Br. abortus* has been found to be so highly sensitive to thionine blue and its use should provide a rapid and easy means of identification.—S. J. GILBERT.

KOSER, S. A., & BAIRD, G. R. (1944.) **Bacterial destruction of nicotinic acid.**—*J. infect. Dis.* **75.** 250–261. [Authors' summary copied *verbatim*.] 2323

Bacteria of the green-fluorescent pigment-producing group, *Pseudomonas fluorescens* and allied types, and also *Serratia marcescens* and related species are able to grow in a simple synthetic medium containing nicotinic acid as the only organic compound.

Low concentrations of nicotinic acid support growth while amounts of 0·5 to 1·0% often delay growth or inhibit it entirely.

Destruction of nicotinic acid, as measured by chemical method, occurs during cell multiplication. When 0·1% nicotinic acid is supplied often 95% or more of the vitamin is utilized, in the presence of 0·5% nicotinic acid a smaller proportion of the total amount is destroyed.

Many cultures fail to grow or grow but poorly when nicotinamide is substituted for the acid. All cultures fail to grow when the isomers, isonicotinic and picolinic acids, are supplied in place of nicotinic acid. Several other derivatives are utilized less readily than nicotinic acid.

Both groups of bacteria causing the breakdown of nicotinic acid also synthesize the vitamin when grown in mediums originally devoid of it.

The results emphasize the broader field of destruction of vitamins by bacteria, in contrast to the better-recognized role of vitamins as coenzymes or accessory factors.

WEINSTEIN, L., & MCDONALD, A. (1945.) **The effect of urea, urethane and other carbamates on bacterial growth.**—*Science.* **101.** 44–45. 2324

Concentrations of urethane and urea up to 3 and 6% respectively were found to be bacteriostatic for a number of types of pathogenic bacteria in serum-veal infusion media. Other urea derivatives, such as propyl and butyl carbamates, were bacteriostatic at lower concentrations. Studies were also made of the rate of killing at varying concentrations and with various types of organism.

Both urea and urethane produced antagonism of *p*-aminobenzoic acid, the inhibitor of sulphanilamide, and the combination of non-bacteriostatic amounts of urea and urethane with non-bacteriostatic amounts of sulphanilamide successfully prevented bacterial growth. Both urea and urethane have an appreciable effect in increasing the solubility of the sulphonamides.

The mode of action of the bacteriostasis is unknown. A small number of various types of infection in man have been treated with 1 g. sulphanilamide in 100 ml. water containing 10 g. urethane; those infections in which Gram-negative organisms predominated responded by a rapid sterilization and healing of the wounds; infections with Gram-positive bacteria were more refractory. The use of urethane did not appear to impair wound healing.—A. EDEN.

I. BONEZZI, G., CAVALLI, L., & MAGNI, G. (1943.) Quantitative Untersuchungen über die Virulenz. I. Mitteilung: Eine Virulenzgleichung und ihre biologische Deutung. **[Quantitative investigation of virulence. I. A virulence equation and its biological significance.]**—*Zbl. Bakt. I.* (*Orig.*). **150.** 17–25. 2325

II. CAVALLI, L., & MAGNI, G. (1943.) Quantitative Untersuchungen über die Virulenz. II. Mitteilung: Die bakteriostatische Wirkung der Sulfanilamide in vivo. **[Quantitative investigation of virulence. II. *In vivo* action of the sulphonamides.]**—*Ibid.* 25–32. 2326

I. Using experimentally induced mutants of *Bacillus anthracis* the authors [(1942.) **G. Batt. Immun.*] have shown the existence of a linear relationship between survival time of inoculated animals (subcutaneous injection in mice) and the logarithm of the number of organisms injected. Further experimental results confirming this finding are given. The authors give a theoretical mathematical treatment of the problem of virulence and suggest a new method for its analysis and evaluation which enables the two components, the rate of multiplication of the organism and the toxicity, to be separated.

II. The existence of a linear relationship between the logarithm of the number of organisms injected and the time of survival was confirmed by using type I pneumococci injected subcutaneously into mice. Using the mathematical analysis of virulence which this finding renders possible, the authors show that the

chemotherapeutic effect of sulphapyridine can be explained purely on the ground of bacteriostasis and that an " anti-endotoxin action " is not involved.

A method of calculating the mean survival time in groups of animals receiving the same dose of organisms is described. The method is applicable also when some animals survive indefinitely.—E. G. WHITE.

See also absts. **2383** (anthrax), **2439** (streptococci), **2457** (strangles and broncho-pneumonia), **2418** (diet and pneumococcus infection), **2376**, **2403**, **2453**, **2458** (listeria), **2377-2379** (corynebacteria), **2395** (fowl TB. and typhoid), **2460** (salmonella), **2363** (swine dysentery), **2391** (glanders and bovine contagious pleuro-pneumonia in camels), **2453-2455** (bactericidal agents).

DISEASES CAUSED BY PROTOZOAN PARASITES

CHEN, G., GEILING, E. M. K., & MACHATTON, R. M. (1945.) **Parasitemia and length of survival of mice infected with** *Trypanosoma equiperdum*.—*Amer. J. Hyg.* **41.** 221–227. **2327**

The influence of the number of trypanosomes in the infecting dose on the degree of parasitaemia and on the survival time was studied in white mice infected with varying known numbers of *T. equiperdum*. To produce a partial suppression of parasitaemia, some of the group of mice were given intramuscular injections of tartar emetic. Deaths of mice were recorded at the end of each hour. It was found that a lag of 6–7 hours occurred in the degree of parasitaemia following infection by the intraperitoneal route as compared with the intravenous route. It was also found that there was a lapse of 6–7 hours before the number of parasites in the circulation equalled the number which had been injected intraperitoneally.

Statistical analysis of the results showed that the deviation of survival time in groups of mice receiving varying doses of trypanosomes was about the same and that a linear relationship existed between the logarithm of the degree of parasitaemia and the duration of infection.

The results are explained partly by the fact that mice do not acquire immunity to *T. equiperdum* and partly by the fact that the parasites generally produce their toxic effect at the termination of infection shortly before death. A formula is given for calculating the survival time and the number of parasites in the circulation at any given time following intraperitoneal or intravenous injection of a known number of trypanosomes, assuming that their reproduction follows a geometrical progression.—J. K. H. WILDE.

•ALBANO, V. (1941.) Prime osservazioni di Leishmaniosi canina nei Comuni Vesuviani della provincia di Napoli. [*Leishmania canina* **infection in the Province of Naples.**]—*Fol. med.* (*Napoli*). **27.** 542–546. [Abst. from abst. in *Dtsch. tropenmed. Z.* **47.** 125–126.] **2328**

A short description is given of the clinical symptoms of cutaneous and visceral leishmaniasis in the dog, the detection of which disease is recorded in two districts of the Vesuvius area. As these two districts are also those principally involved in human infantile leishmaniasis it is considered that the canine and human infection must be connected.

None of the dogs showed cutaneous lesions and infection was detected by examination of material from the spleen, liver or bone marrow.—U. F. RICHARDSON.

PEREIRA, C., & ALMEIDA, W. F. (1943.) Revisão das espécies de " Trichomonas Donné, 1836 " da galinha e do pombo domésticos. [**Revision of the species of** *Trichomonas* **of chickens and domestic pigeons.**]—*Arq. Inst. biol., S. Paulo.* **14.** 273–292. [English summary.] **2329**

The authors review critically the extensive literature bearing on the systematic classification of the trichomonads of fowls and domestic pigeons, and recognize the following species :– *Trichomonas* (*Trichomonas*) *gallinae* (Rivolta, 1878), characterized by four free flagella and inhabiting the upper part of the digestive tract and the liver of fowls, pigeons and several other hosts ; *Trichomonas* (*Pentatrichomonas*) *eberthi* (Kent, 1880), with five free flagella and inhabiting the ileum, caecum, and liver of the fowl ; *Trichomonas* (*Tritrichomonas*) *columbae* (Rivolta, in Railliet 1885), with three flagella, inhabiting the duodenum of the pigeon. Other characters differentiating the three species are tabulated.
—K. J. SINCLAIR.

PEREIRA, C., & DE ALMEIDA, W. F. (1943.) Sobre alguns preconceitos morfológicos no gênero " Trichomonas Donné, 1836 " e sua significação taxonômica. [**Preconceptions of the morphology of the genus** *Trichomonas* **and their taxonomic significance.**]—*Arq. Inst. biol., S. Paulo.* **14.** 195–206. [English summary.] **2330**

The authors review critically the morphological data recorded by other workers, based generally on the examination of wet-fixation preparations, and compare the results with their own observations on dry-fixation specimens stained with Romanowsky stains. The material included trichomonads from man, sheep, g. pigs, pigeons, fowls etc. They conclude that the so-called chromatic granules, both cytoplasmic and axostylar, are artefacts, that the " stalk " of Stabler is merely the axostyle of degenerate forms, that there is no true cytostome or cytopharynx in the trichomonads, and that variations of the axostyle described by various workers have no morphological significance. There is evidence that the undulating membrane is detachable, and the authors consider that the *Eutrichomastix* of KOFOID & SWEZY (1915) should be included in *Trichomonas*. The existence of autotomy could not be established. The conglomeration, rosette formation, and somatellae described in the literature are the result of the attraction to the flagellates of extraneous particles.
—K. J. SINCLAIR.

SCHLOTTHAUER, C. F., MANN, F. C., & ESSEX, H. E. (1944.) **Blackhead in turkeys : notes on its occurrence and its transmission.**—*N. Amer. Vet.* **25.** 603–608. **2331**

Much of this paper reviews the results obtained by previous workers. The original investigations dealt primarily with the epidemiology of blackhead under various experimental and field conditions. It was found that the disease showed a tendency to be seasonal in occurrence, being more widespread among adult turkeys in the spring and among young birds towards the end of the year. It was also noted that by means of artificial hatching and brooding and by ranging the poults on ground uncontaminated by chickens and adult turkeys, it is possible to maintain a flock of turkeys fairly free from the disease, even when chickens are kept in close proximity. The authors also investigated the matter of a practical surgical technique for occluding the caeca and the effect of this operation on the growth and development of birds, and on egg production, fertility, hatchability, and viability. All these processes were found to be essentially normal in birds with occluded caeca. Experiments carried out indicate that *Histomonas meleagridis* can exist in the soil and is readily transmitted to susceptible turkeys by contact. Turkeys with surgically occluded caeca were more resistant to blackhead than those with normal caeca. When turkeys with occluded caeca were allowed to

range over heavily infected premises, losses from blackhead were as great as 33% during a single outbreak. Susceptible turkeys may be kept free of infection by keeping them on a raised floor away from contact with the ground.—C. HORTON SMITH.

HUFF, C. G., & COULSTON, F. (1944.) **The development of *Plasmodium gallinaceum* from sporozoite to erythrocytic trophozoite.**—*J. infect. Dis.* **75.** 231–249. **2332**

This important paper should be consulted in the original by those interested. The authors present a detailed account of the stages in the life-cycle of *P. gallinaceum* which occur between the inoculation of sporozoites and the first appearance of the erythrocytic forms. The paper is the first of a series on work begun in October 1940, preliminary reports of which were published in 1940–44.

The elucidation of these stages has been made possible by the elaboration of a technique by which it is possible to obtain for study maximum concentrations of sporozoites in a small area of skin. This technique is described in detail. *Aëdes aegypti* were allowed to bite infected chicks and the heavily infected salivary glands from as many as 200 mosquitoes were massed together and taken up into the tip of a 27-gauge needle in a minimal quantity of a mixture of chicken serum and distilled water. Injection was made into the skin on the dorsal side of the wing web of chickens. Methods of identifying the area of skin are described. The development of the sporozoite was studied in sections of the skin from the site of inoculation. Studies of development in other organs following intravenous inoculation of large numbers of sporozoites were also made. The perfection of the technique has made possible experimental studies of immunity and of the action of antimalarial drugs in the period between inoculation and the appearance of the parasites in the blood stream. The authors show that sporozoites enter cells of the lymphoid-macrophage system within 30 min. after inoculation into the skin. In these cells the first generation of parasites (cryptozoites) develops into large schizonts and segmenters. This generation requires about 42 hours. The second generation (metacryptozoites) is formed in the same cells and also in endothelial cells. The earliest parasite seen in an erythrocyte was found 75 hours after inoculation. Erythrocytic parasites increase gradually up to about six days. Then follows a precipitous increase. This "flooding" effect, the authors believe, cannot be explained by the multiplication of erythrocytic trophozoites. They believe that the metacryptozoites after some generations in lymphoid-macrophage and endothelial cells enter the erythrocytes in large numbers. They warn against the assumption that the cycle described by them for *P. gallinaceum* will hold good for other species of *Plasmodium*. In other species the cryptozoic development may take place in different kinds of cells than those utilized by *P. gallinaceum*.

The various stages described are well illustrated in coloured plates.—M. C.

REDMOND, W. B. (1944.) **Mosquito transfer of the pigeon strain of *Plasmodium relictum*.**—*J. infect. Dis.* **74.** 184–188. **2333**

The strain of *P. relictum* isolated by COATNEY and established by him in pigeons has been maintained by R. for two years in canaries by blood inoculation.

Mosquito transfer from canary to canary was readily obtained using *Culex pipiens*. The mosquito-transmissible strain has been designated the 1P1–1 strain. It has not been possible to transmit this strain by mosquitoes from pigeon to pigeon nor from canary to pigeon. In attempts to effect this, *C. pipiens* and *Aëdes aegypti* were used. The reasons for this failure are discussed and R. considers that his results indicate that a genetic alteration has been produced by passage through *C. pipiens*. It is possible that the pigeon is not the normal host, which may be a bird more closely related to the canary. The paucity of records of mosquito transmission from one species of host to another is pointed out. Further work on these lines may throw light on the genetics of the parasite.—M. C.

SILVERMAN, M., CEITHAML, J., TALIAFERRO, L. G., & EVANS, E. A., Jr. (1944.) **The in vitro metabolism of *Plasmodium gallinaceum*.**—*J. infect. Dis.* **75.** 212–230. **2334**

The work done in recent years on the metabolism of malarial parasites is briefly reviewed and the results are reported of a study of the metabolism of *P. gallinaceum* in washed suspensions of parasitized red corpuscles. A direct correlation between the surface area of the parasite and the various metabolic activities has been demonstrated. The respiration of *P. gallinaceum* was found to be about 70 times that of a normal chicken erythrocyte. Lactate and pyruvate are utilized by parasitized erythrocytes. Quinine added at concentrations as low as 6×10^{-6} M inhibits respiration in parasitized erythrocytes whereas even at high concentrations it does not do so in the case of normal erythrocytes. The action of atebrin at low concentrations is similar to that of quinine.—M. C.

CALDWELL, F. E. (1944.) **In vitro effects of high temperatures on avian malarial parasites.**—*J. infect. Dis.* **74.** 189–205. **2335**

C. reviews the history of attempts to modify protozoa by alterations of their environment. Practically all attempts to modify periodicity in avian malaria have involved alteration of the environment or physiology of the avian host. C. has attempted to obtain a permanent modification by subjecting the parasite itself to sublethal temperatures.

The parasites used were strain 3H1–2 of *Plasmodium cathemerium*. The technique and the results obtained are described in detail. The thermal death point was found to be 50°C. for 8 min. Three separate strains were isolated from strain 3H1–2 of *P. cathemerium* by exposing the parasite to a temperature of 50°C.

One of these strains showed a marked disturbance of synchronization in the production of both sexual and asexual forms. Seven months later the strain had returned to normal. In another of the strains the parasites almost lost their power of gametocyte production and were incapable of infecting mosquitoes. The significance of these findings is discussed at some length.—M. C.

DA SILVA LEITÃO, J. L. (1943.) Infestação natural de bovinos portugueses pelo Anaplasma marginale (Theiler, 1910). [*Anaplasma marginale* **infection of cattle in Portugal.**]—*Repos. Lab. Pat. vet., Lisboa.* **5.** 263–267. [English, French and German summaries.] **2336**

An outbreak of anaplasmosis is reported in Lisbon, which was due to a simple infection by *A. marginale*. Observations on blood smears confirm findings previously published. The pathogenicity of the pure infection is emphasized. Cultural forms described by LIGNIÈRES were not found and in no case was *Ixodes* observed.—K. J. SINCLAIR.

PELOURO, J. T. (1943.) Toxoplasmose espontânea em coelhos. [**Toxoplasmosis in rabbits.**]—*Repos. Lab. Pat. vet., Lisboa.* **5.** 241–246. [English, French and German summaries.] **2337**

P. describes the symptoms and lesions caused by *Toxoplasma cuniculi* in experimental rabbits obtained

from the Central Laboratory for Veterinary Pathology, Lisbon. The parasite had not previously been described in Portuguese literature. Lesions were observed on the surface as well as in the substance of the spleen.
—K. J. SINCLAIR.

I. DE AZEVEDO, J. F. (1943.) Nouvelles données sur l'infection des chiens de Lisbonne par les leptospires. **[New observations on the infection of dogs with leptospira.]**—*Ann. Inst. Med. Trop. Lisbon.* **1.** 13–69. [In French.] **2338**

II. DE AZEVEDO, J. F., & SILVA, M. M. (1943.) Sur l'infection des rats de Lisbonne par le *Leptospira icterohaemorrhagiae.* **[The infection of rats in Lisbon with** *L. icterohaemorrhagiae.***]**—*Ibid.* 79–96. [In French.] **2339**

I. One hundred and twenty-five stray dogs caught in Lisbon from June-August, 1942, were studied. Ten out of 103 were positive either on direct microscopic examination of the kidneys or on culture. 121 sera were tested for agglutination using a local strain of *L. icterohaemorrhagiae* and a Dutch strain of *L. canicola.* Of these, 18·2% were positive, 13·2% with *L. canicola* and 5% with *L. icterohaemorrhagiae.* The majority of the dogs giving positive aggln. tests were 1–2 years old. Only one below this age, and none aged three years or over, was positive.

A. considers that *L. canicola* is a variety of *L. icterohaemorrhagiae* rather than a distinct species and is of the opinion that dogs must be responsible for a certain number of human cases of the disease.

II. 528 rats were examined, all *Rattus norvegicus* caught in Lisbon during January-July, 1941, and January-May, 1942. The kidneys of 133 were tested, 32·5% being positive on animal inoculation, as against 24·1% on culture, 20·3% on dark-field examination and only 4% in silver-stained sections. A further 125 kidneys examined only by dark field gave 39·2% positive. Adult rats were 56·9% positive as compared with only 8·8% of young rats. The Lisbon organism studied in cultures from 26 sources agrees in its properties with *L. icterohaemorrhagiae.*—M. C.

DA SILVA LEITÃO, J. L. (1943.) Treponemose dos leporideos. **[Venereal spirochaetosis of rabbits in Portugal.]**—*Repos. Lab. Pat. vet., Lisboa.* **5.** 289–299. [English, French and German summaries.] **2340**

Lesions in the genitalia of rabbits infected with venereal spirochaetosis are described. Using the Romanowsky modification of Ziehl's staining technique, the author records average dimensions of the causal agent in comparison with data for *Treponema cuniculi* Noguchi. The dimensions differentiate the Portuguese strain from Noguchi's organism and from the human spirochaete, *Treponema pallidum.*—K. J. S.

See also absts. **2363** (*Balantidium coli*), **2384**, **2482** (trypanosomes), **2393** (canine babesiasis), **2451** (*Plasmodium lophurae*), **2461** (fowl coccidiosis).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*LÉPINE, P. (1942.) Les anticorps tissulaires dans les infections à virus. **[Tissue antibodies in virus infections.]**—*Arch. ges. Virusforsch.* **2.** 406–416. [In French.] [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 13–14.] **2341**

In the course of virus diseases the existence of a refractory state in the host is primarily a function of the degree of tissue resistance. According to the route of infection, the organ inoculated, and the refractory state of the local tissues, the virus may remain limited to the inoculated organ or extend progressively to other organs, tissues or throughout the whole body.

The extension of immunity is usually accompanied by the production of antibodies which may be demonstrated in the circulating blood. These antibodies are only a phase in the genesis of the refractory state; they may be present in its absence or disappear despite the persistence of the refractory state.—D. L. HUGHES.

I. *BIANCHI, E. (1942.) **[An outbreak of Aujeszky's disease in pigs.]**—*Clin. vet., Milano.* **65.** 51. **2342**

II. *VIANELLO, G. (1942.) **[An outbreak of Aujeszky's disease in piglets in Lombardy.]**—*Ibid.* 63. **2343**

[Absts. from absts. in *Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 188.]

I. A disease with symptoms of paralysis, constipation, lack of appetite and encephalitis with convulsions broke out on two pig farms in Italy. Some animals recovered, others died of grave nervous disturbances after 2–3 days. Pure-bred Romagna pigs were more susceptible than the less valuable Toskanas. Transmission experiments confirmed the diagnosis. The virus was found to be identical with a Hungarian one.

II. Of 450 pigs and more than 1,000 piglets, 90 pigs and 800 piglets died in this outbreak, the origin of which is unknown. Fever and nervous disturbances occurred. The lesions were not typical but transmission experiments confirmed the diagnosis and the virus was detected in the urine of dead piglets. Fully grown pigs which recovered and their piglets were immune.—F. D.

HABEL, K. (1945.) **Seroprophylaxis in experimental rabies.**—*Publ. Hlth Rep., Wash.* **60.** 545–560. **2344**

Since immune serum generally ceases to be effective in virus diseases once the virus has entered the susceptible cell, its use in practice is largely limited to instances where the time of exposure is known. H. points out that theoretically serum should be highly effective in rabies because the time of exposure is usually definitely known and the incubation period is prolonged. He reviews briefly past work on the serum prophylaxis of rabies. In experimental investigations of rabies there have rarely been marked differences between the control and vaccinated animals when an interval of 24 hours or more has elapsed between the inoculation of virus and the beginning of treatment. H. considers that the explanation lies in the short incubation period in small animals.

He describes a series of carefully controlled experiments on mice, g. pigs, rabbits and monkeys in which the use of serum alone and combined with vaccine is compared with the use of vaccine alone. In his experiments concentrated immune serum gave good protection even when given 48 hours after infection. In cases where serum did not prevent death, the survival period was much longer than in controls. Results were especially good when the serum was injected intramuscularly, at the site of virus injection. H. concludes that immune serum acts beneficially in two ways: it can, when given early, destroy the virus locally while it is still in the muscle or it can, when given later, retard the spread of the virus within the nervous tissues, as evidenced by the prolongation of the incubation period. He considers that this prolongation of the incubation period has great practical value in giving time for the vaccine to become effective and suggests that trials of serum either alone or combined with vaccine are warranted in the prophylaxis of rabies in man.—M. C.

IONESCU, D. (1943.) Untersuchungen über die Autolyse von Tollwutgehirnen. **[Autolysis of the brain in rabies.]**—*Zbl. Bakt. I. (Orig.).* **151.** 21–25. **2345**

The author compared the rate of autolysis of the brain of a rabid and of a normal dog kept in the dark at 18°C. and found that the infected brain withstood autolysis better than the normal brain and retained its virulence for four months; this is apparently due to the restraint exerted by the rabies virus on the normal autolytic ferment. Negri bodies remained visible after the cells had been completely destroyed.

In a study of the autolysis of the horn of Ammon in animals infected with fixed rabies virus he observed fine oxyphile granules and small Negri bodies after eight days. The Negri bodies exposed to autolysis enlarged in some cases to twice the size of those in the fresh brain. This enlargement and the oxyphile granules point, it is claimed, to an increase of the rabies virus so long as the virus-infected cell retains its vitality. After nine days when the cell is completely destroyed the Negri bodies are avirulent.

*STRIMPL, V. (1938.) Sur la libération du virus rabique. **[Collection of rabies virus relatively free from tissue.]**—*Anal. Inst. Victor Babes, Bucarest.* **9.** 212–217. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 18.] **2346**

S. has designed an instrument for the electrophoresis, electrodialysis or electrofiltration of protein suspensions. Under the influence of electric current he has freed rabies virus, modifying its character so that its incubation period in animals is reduced from 5 days to 24–28 hours. He attempts to give a physical explanation of the change observed. It was difficult to maintain the pH constant in the apparatus and this fact complicates his explanation.—D. L. HUGHES.

*LEVADITI, C., KRASSNOFF, D., REINIÉ, L., & BÉQUIGNON, R. (1938.) Ultrafiltration du virus rabique. **[Ultrafiltration of rabies virus.]**—*Anal. Inst. Victor Babes, Bucarest.* **9.** 114–123. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 18.] **2347**

In filtration studies of rabies street virus and fixed virus the authors were unable, contrary to previous reports, to demonstrate any appreciable difference in size between the infective bodies of these two varieties of virus. They found the filtration end-point to be about 300 mμ, which corresponds to an actual size of virus of 150–225 mμ.—D. L. HUGHES.

*GERLACH, F. (1938.) Ueber die Morphologie des Virus der Tollwut. **[The morphology of rabies virus.]**—*Anal. Inst. Victor Babes, Bucarest.* **9.** 62–67. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 14.] **2348**

Numerous authors have described granular bodies in the nervous system of animals that have died from rabies, but have not agreed on their significance. By means of various stains and fluorescent illumination, G. studied granules in the meninges, central nervous system, salivary glands and the serous lining of the body cavities. In some cases these bodies were in such numbers as to give the impression of pure cultures. The bodies were observed in infections with street, fixed and passage viruses. They fulfilled all the criteria of elementary bodies, and G. considered they are the infecting agent. In the ensuing discussion certain speakers disagreed with this view, maintaining that the formations were probably degenerative products.

—D. L. HUGHES.

*MARINESCO, G., CRACIUN, E. C., & ROSCA, V. (1938.) Contributions à l'étude du virus rabique "in vitro". **[*In vitro* virus of rabies virus.]**—*Anal. Inst. Victor Babes, Bucarest.* **9.** 155–164. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 17.] **2349**

The nerve axis tissues of the rabbit and adult dog do not proliferate *in vitro*; nevertheless it is possible to prolong their survival by maintaining them in a nutritive medium. Rabies virus can be cultivated in this medium and the virulence of the strain does not appear to alter. The virus diffuses directly through the nerve tissue, but does not do so through the culture fluid. The virus is thus capable of diffusion and multiplication *in vitro* in the presence of viable nerve tissue.

Fixed virus multiplies better in these *in vitro* conditions than does street virus, although street virus survives longer even in the absence of nerve tissue in the culture.—D. L. HUGHES.

*SCHÜKRÜ-AKSEL, I. (1938.) Sur la nature des corpuscules de Negri. **[The nature of Negri bodies.]**—*Anal. Inst. Victor Babes, Bucarest.* **9.** 205–212. [Abst. from abst. in *Bull. Inst. Pasteur.* **42.** 15.] **2350**

Negri bodies are not protozoa. The modified Feulgen reaction fails to show the presence of nucleolar material and there is no reason for placing these structures in the family Glugeidae. Neither are these bodies simple products of degeneration; they appear rather to be a product resulting from the multiplication or metabolism of the virus in the interior of the ganglion cell. Herzberg's method of staining fails to show evidence of elementary bodies in smears from infected tissue.—D. L. HUGHES.

NAGLER, F. P. O. (1944.) **Red cell agglutination by vaccinia virus. Application to a comparative study of vaccination with egg vaccine and standard calf lymph.**—*Aust. J. exp. Biol. med. Sci.* **22.** 29–35. [Author's summary copied *verbatim.*] **2351**

Vaccinia virus grown on the chorioallantois of developing chick embryos has been used for the vaccination of more than 1,500 subjects with clinically satisfactory results.

With an adequately high titre preparation the proportion of failures to take is very low (0·24 p.c.) but with virus of lower titre the proportion of successes may be inferior to those obtained with calf lymph.

The antibody response as judged by red cell agglutination methods (Hirst's test) is of the same order in subjects vaccinated with egg vaccines or calf lymph.

The antibody response in revaccinated persons is correlated with the clinical type of their reaction, being greatest in those who give a primary type reaction, least in those showing an immune reaction. More than half of a group of persons who had been vaccinated at various times previously showed some residual antibody.

Glycerolated egg vaccine loses titre significantly more rapidly than matured calf lymph. Fowl red-cell agglutination is not a suitable method for titrating the activity of vaccinia virus; calf lymph of high virus content gives only equivocal agglutination and egg vaccine may show a sharp drop in its content of active virus with little change in its agglutinating power.

NORTH, E. A. (1944.) **A study of the immunological reactions of the variola and vaccinia viruses grown in the developing egg.**—*Aust. J. exp. Biol. med. Sci.* **22.** 105–109. [Author's summary copied *verbatim.*] **2352**

The present state of knowledge concerning the transformation of variola to vaccinia is discussed.

Previous reports dealing with the appearance of membranes and attempts at animal passage do not suggest that variola is transformed to vaccinia on continued egg passage.

The characteristics are reported of the Hirst reaction using variola virus grown on the egg. These are different from the Hirst reaction with vaccinia and indicate a difference in the viruses. The Hirst and pock-inhibiting antibodies of the two viruses are similar, if not identical.

BURNET, F. M. (1943.) **Characteristics of the influenza virus-antibody reaction as tested by the method of allantoic inoculation.**—*Aust. J. exp. Biol. med. Sci.* **21.** 231–238. [Author's summary copied *verbatim.*] **2353**

A study has been made of the conditions which determine whether or not infection follows the inoculation of influenza virus-immune serum mixtures into the allantoic cavity of 11-day chick embryos.

When the concentrations of virus and immune serum giving neutral (50 p.c. infection) mixtures are plotted logarithmically they fall over most of the range on an approximate straight line corresponding to the equation $V = b\ S^a$ where a has a value of 3–4, i.e. the neutralizing power of the serum falls off rapidly on dilution. In most experiments there was a significant deviation from a straight line when the reagents were used at high concentration. Here the slope corresponded to a value of a nearer to 1.

By choosing suitable mixtures well marked reactivation by dilution could be demonstrated; the diluted mixtures were however less active than mixtures of the same final constitution made by combining initially diluted reagents. Influenza virus strains well adapted to growth in the allantoic cavity are more difficult to inactivate by serum than strains with only a few passages in this situation. A comparison by several methods of the inactivation of the strain "W. S. Egg" by homologous immune ferret serum shows that the Hirst haemagglutination method shows the greatest apparent activity of the serum and the allantoic method the least. Mouse-lung titrations and titrations by the chorio-allantoic pock counting methods gave intermediate values.

The bearing of these results on the titration of human immune sera is discussed.

BURNET, F. M., BEVERIDGE, W. I. B., & BULL, D. R. (1944.) **Study of a strain of influenza B virus isolated by chick-embryo inoculation.**—*Aust. J. exp. Biol. med. Sci.* **22.** 9–16. [Authors' summary copied *verbatim.*] **2354**

A strain BON of influenza B virus has been isolated by amniotic inoculation in chick embryos and the changes associated with adaptation to growth in chick tissues have been studied.

Multiplication of the virus takes place more slowly than with influenza A and no discontinuous change from unadapted to adapted state has been clearly demonstrated. In the unadapted state the virus fails to multiply after inoculation into the allantoic cavity but this capacity can be developed by passage.

Eight- and ten-day embryos are much more sensitive than are 12-day ones in detecting limiting dilutions of unadapted BON virus. Yolk-sac passage can be carried for at least nine generations without demonstrable change in the unadapted character of the virus.

Serologically the strain is only distantly related to the standard B strain "Lee".

CARNEIRO, V., & CUNHA, R. (1943.) Estudos sobre a encefalomielite infecciosa dos equideos no Brasil. **[Equine encephalomyelitis in Brazil.]**—*Arq. Inst. biol., S. Paulo.* **14.** 157–194. [English summary.] **2355**

Immunological studies are reported on the E.E. virus previously isolated by CARNEIRO [see *V. B.* **9.** 389] from infected horses in Sao Paulo, Brazil. The virus has now been passaged in g. pigs 80 times by the intracerebral route, the animal being killed in 3–4 days. The virus is infective for g. pigs and mice at dilutions of 1 : 10,000 and occasionally at 1 : 100,000. It was possible to culture the virus in chick embryo and to obtain highly infective titres (10^{-7} to 10^{-8} for the g. pig) by cerebral inoculation. Formolized chick embryo cultures yielded a vaccine immunizing g. pigs against 1,000 and 10,000 lethal intracerebral doses. At 4°C. the antigenic property of the vaccine is preserved for at least 8-10 months.

Cross immunity tests were performed employing two techniques, the subcutaneous inoculation of g. pigs with vaccine alone or the subcutaneous inoculation of vaccine followed by the intracerebral inoculation of virus. Tests were made with two Western strain viruses, one Californian and one Argentine, with a Venezuelan virus, and with an Eastern strain. Cross-immunity relationship was not found between the Brazilian virus and the Western strain viruses. G. pigs solidly immunized against the Venezuelan virus were protected to some extent against the Brazilian virus. G. pigs immunized against the Eastern strain were protected against the Brazilian strain, but the reverse did not always hold good. G. pigs protected against the Brazilian strain by means of vaccine and virus showed partial immunity to the Eastern strain. Differences exhibited between the Brazilian and the classic Eastern strain are the longer incubation period (4–5 days) of the Brazilian strain in the g. pig and the longer course of the disease in the case of the Brazilian type. The authors suggest that the Brazilian virus should be classed with the Eastern type.—K. J. SINCLAIR.

KEMPF, J. E., PIERCE, M. E., WILSON, M. G., & SOULE, M. H. (1945.) **The effect of chlorination on the virus of Eastern equine encephalomyelitis in the presence of organic substances.**—*J. infect. Dis.* **76.** 120–125. [Authors' summary and conclusions copied *verbatim.*] **2356**

In an extension of previous studies of the effect of chlorination on the virus of poliomyelitis it became necessary to substitute the virus of Eastern equine encephalomyelitis because of the unavailability of susceptible animals. This choice was made because of similarity in size, in neurotropic tendencies and availability of large numbers of susceptible mice. Suspensions of infected mouse brain tissue (1–1,000 MLDs) in distilled water prepared so that there was no chlorine demand were consistently inactivated by 0·75 ppm to 0·90 ppm of chlorine (ortho-tolidine indicator); 0·68 to 1·10 ppm (starch-iodide indicator). The potency of the virus seemingly was not involved between values of 1–1,000 MLDs; more virulent material was not studied. When the distilled water suspensions were mixed with 0·75% monkey spinal cord, 0·01 and 0·02% gelatin or river water, an increase in chlorine concentrations was essential for inactivation. Since these substances all had definite chlorine demands the virus was suspended in river water and the break-point technique of chlorination as carried out in municipal practice studied. The findings were inconsistent, but it could be concluded that water containing chlorine in excess of the amount required to produce a break-point was destructive to the virus.

Distilled water suspensions of the virus were inactivated with chlorine and then an attempt was made to reactivate the virus by the addition of sodium thiosulphate or by dilution. The results were negative.

*CZEKELIUS, F. (1942.) Pathologisch-anatomische und histologische Befunde bei Pferden mit experimenteller ansteckender Blutarmut. **[Morbid anatomy and pathological histology of experimental equine infectious anaemia.]**—*Inaug. Diss., Berlin.* pp. 26. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 534.] **2357**

Details are given of the incubation period, temperature changes, duration, morbid anatomy and histology,

in 45 solipeds experimentally infected with E.I.A. The findings were in accord with those in the literature.
—E. COTCHIN.

DU TOIT, R. (1944.) **Transmission of horse-sickness and blue-tongue in South Africa.**—*Fmg S. Afr.* **19.** 421–423. **2358**

By the use of the New Jersey light trap it was found that thousands of the blood-sucking midge *Culicoides* could be caught at night in the summer months. Large numbers of these midges were ground up and a suspension of them in salt solution and serum from normal animals was used to inoculate horses and sheep; infection could thus be demonstrated by production of horse sickness in horses or blue tongue in sheep even if only a few insects harboured the viruses. Infection could only be demonstrated from February to May. Some batches of insects were capable of producing both diseases. To exclude infection from blood recently ingested, the insects were kept for ten days before allowing them to bite a susceptible sheep; this animal developed blue tongue. It is assumed that the virus has a developmental phase in the *Culicoides* species and can then be transmitted to a susceptible sheep by the insect's bite.—E. M. ROBINSON.

SELBIE, F. R. (1945.) **Properties and pathogenicity of a virus derived from sheep dermatitis.**—*Brit. J. exp. Path.* **26.** 89–97. **2359**

In a preliminary article [see *V. B.* **15.** 187], S. described lesions produced in rabbits inoculated intradermally from a case of ovine contagious pustular dermatitis.

Further experiments showed that in rabbits highly proliferative lesions resembling papillomas were produced, whereas in the g. pig a more acute, degenerative condition, resembling vaccinia, was observed. Filtration experiments with Berkefeld V candles and high-speed centrifugation indicated that the virus was at least 150 mμ in diameter. Rabbit lesions stored in glycerol were fully infective after one year; virus was recoverable for periods up to eight years. Rabbits which had recovered from a preliminary infection were completely immune for at least 100 days, whereas g. pigs showed only a minor degree of resistance. Sera of recovered rabbits contained neutralizing antibodies which were effective against the rabbit virus, but were ineffective against vaccinia. Antibodies neutralizing the rabbit passage virus, were also found in one out of three lambs which had recovered from the natural disease. As attempts to re-transmit the rabbit virus to lambs were unsuccessful, S. regards his rabbit virus as closely related to that of contagious pustular dermatitis, but not necessarily identical with it.—R. E. GLOVER.

KUCHERENKO, I. I. (1940.) Vydelenie virussoderzhashchikh veshchestv iz formennykh elementov krovi (pri chume svineĭ).—[**Isolation of swine fever virus from the blood.**]—*Veterinariya, Moscow.* No. 5. pp. 3–11. [French summary.] **2360**

In work in Russian laboratories on the isolation of swine fever virus from the blood of infected pigs, the following process was adopted.

Blood was treated with sodium citrate, the plasma isolated and the erythrocytes washed in a physiological saline solution. The washed erythrocytes were mixed with glycerin in the proportion of 6 : 1, 3 : 1 or 1 : 1 and after standing 24 hours on ice were completely precipitated. The precipitated erythrocytes proved to be virulent when inoculated into healthy pigs, death occurring 8-23 days later.—E. W. LEWIS.

ROTOV, V. I. (1940.) Vliyanie stimulyatsii pri poluchenii syvorotki protiv chumy svineĭ. [**Raising the antigenic titre of swine fever antiserum.**]—*Veterinariya, Moscow.* No. 5. pp. 12–16. [French summary.] **2361**

The swine fever antiserum supplied at present for prophylactic or curative purposes is of low titre. For simultaneous inoculation of serum, doses of 100–150 ml. are necessary and for treatment the dose must be doubled. Tables are given showing the effects of the addition of calcium chloride and of alum to the serum. The control serum was effective in a dose of 0·6 ml. per kg. Serum to which calcium chloride and serum to which alum had been added were effective in doses of 0·3 ml. per kg.—E. W. LEWIS.

AGAPOV, S. I. (1940.) K etiologii dizenterii svineĭ. [**The aetiology of swine dysentery.**]—*Veterinariya, Moscow.* No. 4. pp. 74–82. [French summary.] **2362**

This new virus disease of pigs, which may be chronic or acute, is described in detail. Symptoms include a temperature over 41°C., haemorrhagic inflammation of the gastric mucous membrane, swelling and inflammation, with occasional haemorrhage, of the whole or part of the intestine, swelling and hyperaemia of the mesenteric lymph nodes and spleen, petechiae in the heart, kidneys and bladder, pneumonia, liver changes and diarrhoea with blood and mucus. The disease is often fatal, and is accompanied by severe thirst.

Pigs may be experimentally infected by contact or parenteral injection of the virus. By virtue of inconclusive experiments it was concluded that the virus confers no immunity against swine fever. G. pigs, rats and rabbits appear to be immune to the virus.—L. L.

ANDREEV, P. N. (1940.) Issledovaniya po dizenterii svineĭ. (Soobshchenie pervoe). [**Studies on swine dysentery. I.**]—*Veterinariya, Moscow.* No. 5. pp. 23–41. [French summary.] **2363**

Four hundred piglets that were killed or died as a result of dysentery were subjected to bacteriological examination. Organisms, including *Salmonella choleraesuis*, *Proteus vulgaris*, *Bacterium coli*, *Bact. coli* var. *communior*, a paracolon bacillus, *Pseudomonas pyocyanea*, *Aerobacter aerogenes*, *Bact. coli-anaerogenes*, *Clostridium welchii*, *Corynebacterium pyogenes*, *Streptococcus faecalis*, spirochaetes, *Fusiformis necrophorus* and vibrios were found in the substance and contents of the stomach and large intestine and to a lesser extent in the kidneys, liver and spleen. *Balantidium coli* was found in both healthy and infected animals.

The disease can be transmitted from infected to healthy animals by contact, the incubation period being 2–3 weeks. The virus from recovered animals retains its activity for 2–3 months.

It is stated that feeding a pure culture of one or a mixture of two of the above-mentioned bacteria to piglets produced symptoms of dysentery, from which most of the animals died. Many organisms, *e.g.*, cocci, *Cl. welchii*, "*B. coli aerogenes*", *Ps. pyocyanea*, appear when thus given to cause *S. cholerae-suis*, normally merely saprophytic, to become pathogenic. It is stated that when fed in mixed cultures, other organisms, *e.g.*, enterococci and *P. vulgaris* which are harmless alone, became themselves pathogenic or increased the virulence of already pathogenic varieties, producing severer symptoms than when a pure culture alone was fed.

The ingestion or intraperitoneal injection of filtrates of contents from the large intestine or of various affected organs, produced in piglets symptoms which were apparently those of dysentery. This was considered to be due to a filtrable virus, which may be responsible for the increased virulence of otherwise saprophytic bacteria, *e.g.*, *Pasteurella suiseptica*, *Corynebact. pyogenes*, etc.

A. concludes that the aetiology of dysentery is

complex, related to an association of bacteria and a filtrable virus and that incorrect feeding and particularly avitaminosis leading to dyspepsia aggravate the disease.—L. LEVENBOOK.

HAMRE, D., & RAKE, G. (1944.) **Feline pneumonitis (Baker), a new member of the lymphogranuloma-psittacosis group of agents.**—*J. infect. Dis.* **74.** 206–211. **2364**

Experiments performed with suspensions of yolk sac infected with the virus of feline pneumonitis [see BAKER—*V. B.* **13.** 212] showed that this agent belongs to the lymphogranuloma-psittacosis group. The elementary bodies, although smaller than those of lymphogranuloma, had the same morphological and staining properties, whilst complete identity was observed by complement-fixation tests. An endotoxin similar in its action to toxins already prepared from other members of the group was also isolated from heavily infected yolk sacs of moribund chick embryos. This toxin killed 23% of mice inoculated intravenously in 12 hours and 77% in 24 hours. The curve of distribution of deaths showed a great similarity with that induced by the toxin of meningopneumonitis virus; both toxins were lethal in a dilution of 1 : 100 as compared with 1 : 10 for lymphogranuloma and 1 : 5 for mouse pneumonitis. On the other hand, high-titred antitoxic sera produced by the intravenous immunization of rabbits, were highly specific since they neutralized feline pneumonitis virus alone and not the toxins of the other members of the group.—R. E. GLOVER.

KEMPF, A. H., WHEELER, A. H., & NUNGESTER, W. J. (1945.) **Isolation of an agent belonging to the psittacosis-lymphogranuloma group of viruses.**—*J. infect. Dis.* **76.** 135–143. [Authors' summary copied *verbatim.*] **2365**

The isolation of a virus and some of its properties have been described. This virus appears to be another member of the psittacosis-lymphogranuloma group. The already well-recognized difficulties of determining the relationship among the viruses of this group, and the possible identity of some of the known members, have been re-emphasized.

BLOUNT, W. P. (1944.) **Psittacosis in pigeons. A disease communicable to man: an outbreak in Army pigeons.**—*J. R. Army vet. Cps.* **15.** 81–83. **2366**

This article combines a brief history of the disease together with the report of an outbreak amongst birds of the Army pigeon service. Suggestions are made as to its control and prevention.—J. D. BLAXLAND.

HUMPHREYS, F. A., HELMER, D. E., & GIBBONS, R. J. (1944.) **Studies on a virus disease originating in a guinea pig injected with ticks (*Dermacentor andersoni* Stiles).**—*J. infect. Dis.* **74.** 109–120. [Authors' summary copied *verbatim.*] **2367**

Observations on an unidentified filterable virus infection are described. Included is a contribution from the Rocky Mountain Laboratory, Hamilton, Montana. The observations suggest, but do not prove, that the infection originated through the medium of ticks (*Dermacentor andersoni*).

The virus is highly pathogenic for guinea pigs, moderately so (according to Steinhaus) for white mice and probably monkeys, but relatively non-pathogenic for the ground squirrel (*Citellus richardsonii*), fitch (*Putorius foetidus*), white rat, hamster, rabbit, mule deer (*Odocoileus hemionus*), and horse. The great majority of infected guinea pigs die. The few that recover prove solidly immune to subsequent exposures.

In cold storage, 5 to 8 C, the infectious agent may survive for periods up to at least 70 days, but it becomes inactive within 3 days at a temperature of 37 C, and within 20 minutes at 60 C. Formalin in a concentration of 0·25% inactivates the agent within 24 hours. The infectious agent may persist in the blood and tissues of resistant animals for long periods. For example, it was recovered from a white mouse 74 days after inoculation.

Neutralization of the virus is brought about rapidly in vivo by recovered guinea pigs, and also by certain non-susceptible animals that have had a previous exposure. In vitro at 37 C the virus is neutralized by the serum of immune guinea pigs in 18 hours, but at room temperature the virus is not neutralized in 24 hours.

The virus may be maintained indefinitely by serial passage in the embryonic tissue of the developing chick.

Immunity against the virus may be induced in a certain, but small, percentage of guinea pigs by means of formalized spleen tissue vaccine.

ROCA-GARCIA, M. (1944.) **The isolation of three neurotropic viruses from forest mosquitoes in Eastern Colombia.**—*J. infect. Dis.* **75.** 160–169. [Author's summary copied *verbatim.*] **2368**

Three infectious agents pathogenic for white mice on intracerebral inoculation were isolated from wild caught mosquitoes in Eastern Colombia; 2 from groups of *Anopheles boliviensis* and 1 from a group of *Wyeomyia melanocephala.*

These agents were considered to be filtrable viruses because they retained virulence after passage through Seitz and Berkefeld filters, and because attempts to culture micro-organisms from the infectious material were unsuccessful. The viruses were provisionally named Anopheles A, Anopheles B, and Wyeomyia, according to their mosquito origin. Anopheles A and Wyeomyia viruses could be preserved by drying mouse brain suspensions in the frozen state, and the infectiousness of Anopheles B virus in mouse brains was retained by preservation in 50% glycerine at refrigerator temperatures.

All 3 viruses were fatal to white mice on intracerebral inoculation, and could be maintained by serial passage in mouse brains. The viruses were also infectious by intranasal inoculation, but not by intraperitoneal or subcutaneous inoculation in adult mice. Death of the mice was preceded by paralysis of the posterior quarters after infection with Anopheles A or Wyeomyia virus, but the paralytic symptoms were not pronounced after infection with Anopheles B virus. Anopheles A and Wyeomyia viruses were infectious for baby mice on subcutaneous inoculation, but Anopheles B virus was not.

Virus could invariably be recovered from the brain and spinal cord of sick mice. The Wyeomyia virus was also recovered from the adrenals, liver, spleen, lung and heart in sick mice infected by intracerebral inoculation; Anopheles A virus showed a more limited distribution, being recovered only from the adrenals and heart. Anopheles B virus was recovered only from the adrenals. Virus was in no case found in circulation after the third day following inoculation.

Adult mice inoculated intraperitoneally or subcutaneously with any of the 3 viruses showed subsequent resistance to infection by intracerebral inoculation with the same virus. None of the 3 viruses produced immunity to Theiler's mouse encephalomyelitis virus.

Experiments with various laboratory animals and a few species of local mammals are discussed. There was no clinical disease produced in any of the animals studied. Anopheles A virus was recovered once from a rhesus monkey and from 3 of 15 guinea pigs. The post-inoculation sera of some animals, notably opossums, showed protective power in neutralization tests.

Anopheles A virus could be maintained by seria-

passage in chick embryos. Anopheles A and B viruses could be maintained by serial passage in tissue cultures of minced mouse embryos in serum-Tyrode. Neutralization tests showed that all 3 viruses were immunologically distinct from yellow fever virus. Neutralization tests using Anopheles A virus and immune sera for eastern and western equine encephalomyelitis, St. Louis encephalitis, Japanese B virus, West Nile virus, and distemper virus also gave negative results.

BTESH, S. (1944.) **Infective hepatitis in Palestine.**—*Trans. R. Soc. trop. Med. Hyg.* **38.** 35–47. **2369**

Since the end of the 1914–18 war, minor epidemics of infective hepatitis have been recognized in Palestine. The condition is common among both Arab and Jewish children but is rare among adults. The childhood cases are described as being mild and of short duration and it is suggested that such attacks confer immunity for life. B. gives an account of the incidence of the disease with regard to geographical conditions, age and race; his observations are based largely on an outbreak involving over 600 cases at a clearance camp for Jewish refugees from Central Europe.—A. N. WORDEN.

—. (1945.) **Rôle of syringes in the transmission of jaundice. A memorandum by medical officers of the Ministry of Health.**—*Lancet.* **249.** 116–119. [Conclusion copied *verbatim.*] **2370**

Summation of the experiences related suggests that late hepatitis following arsphenamine, gold, and other therapies is an expression of "homologous serum jaundice" communicated by traces of blood transferred on syringes and needles from patient to patient.

The resistance of icterogenic agents to disinfection, and the impossibility of removing all traces of blood from syringes by the methods generally used, are factors calling for revision of existing injection techniques.

OLIPHANT, J. W. (1944.) **Infectious hepatitis: experimental study of immunity.**—*Publ. Hlth Rep., Wash.* **59.** 1614–1616. [Author's summary copied *verbatim.*] **2371**

Ten persons who had had jaundice 12 to 18 months before, following inoculation with icterogenic human serum or yellow fever vaccine containing human serum, did not develop jaundice upon reinoculation with icterogenic yellow fever vaccine. Among 10 normal similarly inoculated controls 3 developed jaundice. Among 10 normal individuals inoculated with icterogenic yellow fever vaccine suspended in 50-percent convalescent serum from homologous serum jaundice patients 1 subsequently developed jaundice, while among 10 controls given vaccine alone there were 3 cases of jaundice. Serum obtained from a case of spontaneous jaundice in Italy produced typical "homologous serum jaundice" in 4 of 11 normal persons. In 10 controls who had had inoculation jaundice, no jaundice was induced by the same serum.

DARZINS, E. (1943.) Rickettsienstudien. **[Rickettsia studies.]**—*Zbl. Bakt. I.* (*Orig.*). **151.** 18–20. **2372**

The problems of culturing and staining rickettsia are as yet unsolved. In experiments to find a selective stain for rickettsia in the tissues the following method was devised.

A slide of chick embryonic tissue showing abundant rickettsia is dried, treated with dilute iodine solution for 30 sec. and rinsed with distilled water. Then without drying it is immediately treated with thionin solution for 5 sec., rinsed and dried. After the first bath, the colour is lemon; after the second, reddish when wet, violet when dry; the specimen becomes bluish after a few days. The rickettsia in the syncytial tissue and outside the cells are deep blue. The tissue background is polychromatic; epithelioid cells are lemon-coloured with a blue or burgundy-coloured nucleus: in these cells rickettsia can be seen as brown to black rod-like forms, grouped around the nucleus.

CERNAIANU, C., & GLUHOWSCHI. (1943.) Infektiöse Kerato-Konjunktivitis der Rinder in Bessarabien (Rumänien), hervorgerufen durch Rickettsia conjunktivae (Coles, 1935). **[Infectious kerato-conjunctivitis of cattle in Bessarabia due to *R. conjunctivae.*]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 329–330. **2373**

The authors investigated an outbreak of the disease in cattle in Balti, Bessarabia, in 1942 and give an account of the symptoms and pathology. Both young and adult cattle were affected, but sheep, although in close contact with infected animals, showed no signs of ill health.

In the early stages there was inflammation of the conjunctiva, which became painful and swollen; this was accompanied by a copious watery discharge, photophobia and a slight rise of temperature. As the acute inflammation subsided, the discharge became cloudy. Sometimes the disease was halted at this stage and receded completely within 10–15 days; more frequently, the sclera and cornea became streaked with blood vessels and the cornea became conical in shape and reddish in colour, but it did not as a rule perforate. Either one or both eyes were affected. The disease persisted 5–6 weeks, at the end of which period the great majority of animals recovered. During the illness the animals lost condition because of difficulties in feeding due to the temporary blindness. About 2% of the animals became permanently blind.

Microscopic examinations revealed the presence of *Rickettsia conjunctivae* [COLES—*V. B.* **6.** 122] in the epithelial cells of the conjunctiva. Smears examined in the early stages show mainly red corpuscles, mononuclears, polymorphs and epithelial cells containing the rickettsia. In the later stages the monocytes tend to disappear and lymphocytes replace the polymorphs. The epithelial cells infected with rickettsia become rarer until they disappear and the bacteria, mainly diplococci, staphylococci, etc., responsible for the secondary infection appear.—H. STÖGER.

*DONATIEN, A., & GAYOT, G. (1942.) Rickettsiose générale du porc. **[Rickettsiasis in pigs.]**—*Bull. Soc. Path. exot.* **35.** 324–325. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 22.] **2374**

In a herd of pigs infected with "pest", serotherapy was refused. To establish the cause of the disease, a healthy pig was inoculated with blood from an infected pig with irregular fever. The inoculated animal died twelve days later, and there was a swollen spleen and serous effusion into the pericardium and peritoneum. A sub-inoculation into a pig was made and at the second passage rickettsia were present in the monocytes and in the endothelium of blood vessels.

*DONATIEN, A., & GAYOT, G. (1942.) Conjonctivité rickettsienne du porc. **[Rickettsial conjunctivitis in pigs.]**—*Bull. Soc. Path. exot.* **35.** 325. [Abst. from abst. in *Zbl. Bakt. I.* (*Ref.*). **144.** 22.] **2375**

In pigs with swine fever, and also in pigs otherwise healthy, the authors saw bodies in cells in conjunctival tissue resembling those that occur in trachoma in man and in conjunctivitis of ruminants. They suggest that these bodies be named *Rickettsia lestoquardi* n. sp.

See also absts. **2391** (rinderpest in camels), **2392** (vesicular exanthema in swine), **2393** (canine rickettsiasis), **2402** (louping-ill, scrapie, dog distemper).

IMMUNITY

ROBBINS, M. L., & GRIFFIN, A. M. (1945.) **Studies on Listeria monocytogenes. II. The effect of heat and alcohol on the stable (somatic) antigens. III. Antibody response to individual components of the antigen mosaic during immunization.**—*J. Immunol.* **50.** 237–245 & 247–254. [Authors' summaries copied *verbatim.*] [For part I, see *V. B.* **15.** 351.] **2376**

II. Stable factors I, II, IV, and V of *Listeria monocytogenes* are not affected by prolonged exposure to 100°C. or by high concentrations of alcohol. Stable factor III is variously affected by heat and alcohol in different strains but does not lose its serological identity. It is suggested that the variable behavior of factor III may be explained on the basis of steric hindrance on the part of adjacent molecules in the cell matrix. Spontaneously occurring, smooth, non-motile variants are the material of choice for antigenic analysis of stable factors.

III. Response to individual antigenic components of *Listeria monocytogenes* varies with the stage of immunization. In the response to labile antigens, antibodies a, b, and d appeared early in the immunization period. Antibody a showed a tendency to decrease toward the end of the period. Antibody c was slow in appearing but developed rapidly in the latter half of the period. The response to stable antigens was more irregular. In two serums, antibody *iii* was very low in the early part of the immunization period, but somewhat later reached a titer as high as or higher than the major antibodies, which were decreasing. It is suggested that repeated analyses during the course of immunization are desirable to obtain complete expression of all antigenic components.

RAMON, G., NICOL, L., & VIRAT, B. (1942.) Etude expérimentale de l'immunité active produite soit par l'anatoxine, soit par un vaccin à la fois anatoxique et "anavirulent", à l'égard de l'infection par le bacille de Preisz-Nocard. [**Production of active immunity to *Corynebacterium ovis* by anatoxin or by an anatoxic and "anavirulent" vaccine.**]—*C. R. Soc. Biol. Paris.* **136.** 766–768. **2377**

The authors tested two anatoxins prepared by formol and heat from nine-day cultures of *Corynebact. ovis*, and two anatoxins in which the organisms were separated by centrifugation. They were injected twice, with a 10-day interval, into groups of rabbits. Eleven days after the second injection, the serum of these rabbits was found to have a high antitoxin content. Twenty-five days after the second injection, all rabbits were immune to a dose of 1 ml. of a 24-hour culture of virulent organisms, lethal to the controls.

Favourable results have attended the therapeutic use of these preparations in horses.—R. M. LOOSMORE.

RAMON, G. (1942.) Détermination, par la méthode de floculation, de la valeur antigène de la toxine et de l'anatoxine du bacille de Preisz-Nocard. [**Titration of toxin and anatoxin of *Corynebact. ovis* by flocculation.**]—*C. R. Soc. Biol. Paris.* **136.** 764–765. **2378**

One unit of antitoxin of a horse which had been injected subcutaneously with *Corynebacterium ovis* anatoxin in tapioca base in three increasing doses at weekly intervals was the smallest amount which would prevent death in a 300 g. guinea pig, injected with 1 M.L.D. of known toxin which would normally kill in less than four days. For current use, a dilution of the serum containing 400 units per ml. is made up. Dilutions containing 20–100 units per ml. are added to equal volumes of the toxin under test in agglutination tubes. The tube in which flocculation first occurs indicates the antigenic strength of the toxin, one unit of toxin being considered to be equivalent to one unit of antitoxin.

R. determined that the antigenic strength as measured by this method, bears a direct relationship both to toxicity for the g. pig and to the immunity produced in rabbits.—R. M. LOOSMORE.

RAMON, G., NICOL, L., & RICHOU, R. (1942.) Le milieu à base de digestion papaïnique de viande de cheval et la production de la toxine du bacille de Preisz-Nocard. [**Production of *Corynebact. ovis* toxin in papain digest horse-flesh broth.**]—*C. R. Soc. Biol. Paris.* **136.** 765–766. **2379**

Details of preparation of the medium are given in full. This medium enables toxins of high potency to be produced from *Corynebacterium diphtheriae*, *Clostridium tetani* and staphylococci and has now proved equally efficient for the production of *Corynebact. ovis* toxin. Growth at the different periods during 10 days resembled that of *Corynebact. diphtheriae* in the same medium.

The organisms were separated by centrifuging, as the toxin is absorbed by filter pads. Titration by the flocculation method [see preceding abst.] showed that the antigenic strength was between 30 and 80 units, the M.L.D. for g. pigs being 0·03–0·012 ml. This toxin is therefore more potent than that prepared by other methods. By the action of formol and heat, an anatoxin is produced, capable of giving rise to active immunity to infection.—R. M. LOOSMORE.

BOYD, W. C., & MALKIEL, S. (1944.) **Quantitative relations between horse hemoglobin and anti-hemoglobin: the condition of antigenicity.**—*J. infect. Dis.* **75.** 262–264. [Authors' summary copied *verbatim.*] **2380**

Although hemoglobin is on the whole a poor antigen, it was found possible to produce fairly good antibodies in rabbits by injecting solutions of crystalline horse hemoglobin, mixed with killed bacilli. Iron and nitrogen determinations enabled the ratio of antibody to antigen in the specific precipitates to be determined. The results were quite in line with those of previous workers who had found hemoglobin to be antigenic. The problem of antigenicity is briefly discussed.

OLIVER-GONZÁLEZ, J. (1944.) **The inhibition of human isoagglutinins by a polysaccharide from *Ascaris suum*.**—*J. infect. Dis.* **74.** 81–84. **2381**

The addition to human serum (blood groups A, B, and O) of the nitrogen-free polysaccharide fraction of *Ascaris lumbricoides*, obtained either by simple hot-water extraction or by peptic hydrolysis of the worms, was observed to inhibit the agglutinating activity of the serum against erythrocytes containing the homologous agglutinogen. Powdered *Ascaris* cuticle was shown to have a similar but less powerful inhibitory effect, but such non-specific polysaccharides as glycogen, starch and insulin made no difference to the agglutinating power of the serum.

The author points out that the inhibitory substance is probably an antigen common to A and B agglutinins, and suggests a possible utilization of this phenomenon in reducing the agglutinin content of pooled serum.

—J. F. A. SPRENT.

BOSE, B. C., & AHUJA, M. L. (1944.) **Detection of pyrogens in fluids by biological methods.**—*Indian J. med. Res.* **32.** 9–14. **2382**

The method of preparation of solutions intended for parenteral injections must ensure the absence of pyrogenic substances. This is a critical study of the

relative merits of the hyperpyrexial and leucopenic reactions in the detection of pyrogens.

After normals for hourly and daily range of variations in rectal temperatures and leucocyte counts in rabbits had been established, 1·0 ml. per 100 g. body weight of autoclaved saline suspensions (25 millions per ml.) of two strains of pyrogenic organisms was injected into each of six rabbits. Three hours after the injection there was a definite pyrexia averaging 1·5° and 1·9°F. respectively for each of the strains. On the other hand, reduction in leucocyte count was not sufficiently pronounced to be significant, showing that the former was the more reliable of the two tests for pyrogen estimation.—V. R. RAJAGOPALAN.

REMLINGER, P. (1944.) Le phénomène d'Antée. (1er mémoire.) [**The "Antaeus" phenomenon.**]—*Arch. Inst. Pasteur Algér.* **22.** 121–124. **2383**

On analogy with the classical fight between Antaeus and Hercules, in which the former suddenly regained strength upon being thrown against the ground, R. uses the term "Antaeus phenomenon" to describe the virulence regained upon inoculation into small animals by bacteria that appeared to be sterile in culture tests.

Cultures of *Bacillus anthracis* grown in broth to which fuchsin was subsequently added, appeared to be sterile on sub-culture and non-motile on examination, but on injection into mice and rabbits, the organisms recovered their vitality and virulence, causing death in these animals with typical manifestations of anthrax. It is suggested that this apparent inhibition of vitality by fuchsin is explained by the decolorization of the bacteria by the cells of the subcutaneous tissues of the animal into which they are injected, with a simultaneous recovery of the vitality and virulence of the organisms. Experiments with other bacteria relating to this "phenomenon of Antaeus" are in progress.—A. EDEN.

See also absts. **2304-2307** (TB. immunization), **2317** (*Past. tularensis* and brucella antigens), **2318** (mucin), **2319** (allergic diagnosis of piglet paratyphoid with "toxoparatyphine"), **2341** (tissue antibodies in virus infections), **2351** (red cell aggln. by vaccinia virus), **2352** (aggln. reactions of pox viruses grown in eggs), **2353** (influenza virus-antibody reaction), **2361** (swine fever antiserum), **2371** (immunity in infective hepatitis), **2405** (production of autoantibodies to kidney), **2435** (antihormone-hormone reaction).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BURTT, E. (1945.) **Hypertrophied salivary glands in Glossina: evidence that *G. pallidipes* with this abnormality is peculiarly suited to trypanosome infection.**—*Ann. trop. Med. Parasit.* **39.** 11–13. **2384**

In dissecting tsetse flies near Amani, Tanganyika Territory, B. found hypertrophied salivary glands in *G. morsitans* and *G. pallidipes*, the incidence of the abnormality in *G. pallidipes* being approximately the same as that found in these flies in Zululand, where one of the highest recorded rates of salivary gland infections of wild *Glossina* was also present. Statistically there appeared to be a relationship between the incidence of hypertrophied glands in *G. pallidipes* and infection with *Trypanosoma brucei*, *T. congolense*, and *T. vivax* and it is concluded that this abnormality is peculiarly suited to the development of trypanosomes, particularly of *T. brucei*.

No connexion appears to exist between the similar abnormality in *G. morsitans* and infection with *T. rhodesiense*.—U. F. RICHARDSON.

See also absts. **2315, 2316** (vectors of tularaemia), **2332, 2333** (of avian malaria), **2336** (of anaplasmosis), **2358** (of horse sickness and blue tongue), **2367** (*Dermacentor andersoni*), **2368** (neurotropic viruses in mosquitoes).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

SCHMID, F. (1943.) Die Magenwurmseuche der Gänse und ihre Bekämpfung. [**Control of *Amidostomum anseris* infestation in geese.**]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 122. **2385**

S. gives an account of *Amidostomum anseris* infestation in geese, dealing with the clinical appearance and course of the disease, its treatment with carbon tetrachloride and the hygienic measures which may be applied for its prevention. No new information is recorded, the paper giving a brief summary of present knowledge.—T. E. GIBSON.

AYGÜN, K. (1943.) Die Echinokkenkrankheit in Zentral-Anatolien. [**Echinoccosis in Central Turkey.**]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **51/49.** 139. **2386**

An analysis of eight years' hospital records was made in order to prepare a report on hydatid disease. Alveolar *Echinococcus* cysts were seen five times. The simple *Echinococcus* cyst occurs in Turkey, the Balkans, the whole Mediterranean region and North Germany, 47 cases being noted in Anatolia during the time covered by the report. Alveolar cysts are found in Germany, Switzerland, the Alps and certain regions of Russia, but in the opinion of the author are exceptional in Anatolia.—T. E. GIBSON.

BAYLIS, H. A. (1945.) **On the probable identity of a cestode of the genus *Diphyllobothrium* occurring in Wales and Eire.**—*Ann. trop. Med. Parasit.* **39.** 41–45. **2387**

B. studied the morphology of cestodes of the genus *Diphyllobothrium* which have been reported from Wales and Eire [see *V. B.* **15.** 49, absts. 312–314]. After consideration of specimens recovered from naturally infected hosts in Eire and specimens obtained by artificial infection from three sources, he concludes that the species is in all probability *D. dendriticum*.—T. E. G.

LARSH, J. E., Jr., & DONALDSON, A. W. (1944.) **The effect of concurrent infection with *Nippostrongylus* on the development of *Hymenolepis* in mice.**—*J. Parasit.* **30.** 18–20. **2388**

Thirty-two mice, 2–3 months old, were infected simultaneously with the eggs of *Hymenolepis nana* var. *fraterna* by stomach tube and larvae of *Nippostrongylus muris* subcutaneously; 32 control mice were given only the tapeworm eggs. It was observed that the development of *Hymenolepis* to the cysticercoid stage was inhibited by the concurrent nematode infestation, although the latter was still in the migratory phase. This inhibition was manifested by smaller cysticercoids, and the percentage development of the cysticercoids in the controls was about twice that in the mice with co-incident nematode infestation.—J. F. A. SPRENT.

See also absts. **2381** (*Ascaris*), **2392** (trichinosis), **2462-2467** (anthelmintics), **2476** (habronemiasis).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

OLSON, C., JR. (1944.) **The species specificity of a lymphoid tumor of the chicken.**—*Cornell Vet.* **34.** 278–280. **2389**

Some neoplasms of the chicken have been shown to be transmissible to other birds, *e.g.*, the Fujinami myxosarcoma has been grown in ducks, and the Rous I sarcoma in turkeys, guinea fowl and pheasants.

In an effort to obtain evidence as to whether lymphoid tumours could be similarly transmitted to other species, O. prepared an inoculum consisting of equal parts of minced tumour and Ringer's solution isotonic to chick erythrocytes, with 1 : 1,000 infusorial earth added to the final mixture. 0·5 ml. of this inoculum was injected into young ducks, pheasants, guinea fowls and turkeys, with chickens as controls.

In many cases lymphoid tumours developed in the chickens, but not in any of the other species; young ducks, pheasants, guinea fowls and turkeys were resistant to intramuscular implants of a lymphoid tumour of the chicken.—JOHN G. CAMPBELL.

See also absts. **2395** (fowl leucosis), **2468** (breast cancers in mice).

DISEASES, GENERAL

KAURA, R. L. (1944.) **Deterioration of cattle in certain parts of India and its probable causes with some practical suggestions to overcome them.**—*Indian J. vet. Sci.* **14.** 132–145. [Reprinted in *Indian vet. J.* **22.** 4–26. (1945.)] **2390**

In India the type of cattle living in areas of humid climate and heavy rainfall is usually poor. The probable causes of this are parasitic diseases, unsatisfactory pasturage, low protein, mineral and vitamin content of the food, and the direct climatic factors of humidity and temperature.

In other countries, the failure to raise good cattle has often been attributed to climatic factors and to deficiencies in Ca, P, Na, Cl and trace elements such as Co and Mn. Malnutrition and low milk yield of cattle in certain parts of India are probably associated with deficiency of P in the soil, or an unbalanced diet, or a diet containing an excess of F. The existence of common grazing grounds for all varieties of livestock is another factor responsible for deterioration in certain tracts; areas such as the Punjab which have better breeds rely mainly on stall-feeding. Meanwhile, K. recommends the growing of fodder crops and points out the need for the use of Ca and P supplements with rice straw, preventive measures against parasitic and bacterial diseases, the prevention of soil erosion in order to conserve minerals, and the provision of trace elements where necessary.—S. W. H. RIZVI.

SAMARTSEV, A. A., & ARBUZOV, P. N. (1940.) K voprosu o vospriimchivosti verblyudov k sapu, chume i P.V.L. krupnovo rogatovo skota. **[The susceptibility of camels to glanders, rinderpest, and bovine contagious pleuro-pneumonia.]**—*Veterinariya, Moscow.* No. 4. pp. 59–63. [French summary.] **2391**

Contrary to popular opinion, it is concluded that camels are susceptible to neither rinderpest nor bovine contagious pleuro-pneumonia. Whilst glanders can be experimentally produced in camels, this disease is of no practical importance.—L. LEVENBOOK.

DUCKWORTH, C. U. (1941.) **Some diseases of garbage fed hogs.**—*Bull. Calif. St. Dep. Agric.* **30.** 152–156. **2392**

Vesicular exanthema was first identified in California in 1932. It was at first confused clinically with foot and mouth disease and suitable eradication measures were applied until the Federal Bureau of Animal Industry declined to pay the indemnity and control by quarantine had to be enforced, since when outbreaks have been more numerous and of increasing virulence. The disease is unknown outside California where it is confined to pigs fed on uncooked refuse. Vigorous control measures are essential.

Trichinosis appears in pigs similarly fed, infection being spread by raw pork scraps. In spite of the high standard of Federal meat inspection, no adequate measures are undertaken to ensure that pork is free from trichinae.—S. M. G.

—. (1944.) **Fevers of dogs in India.**—*Indian Fmg.* **5.** 136. **2393**

In this brief article it is reported that in addition to *Babesia canis* and *B. gibsoni* infections, a fever due to *Rickettsia canis* is also present in India. It is also believed that "tick-fever" in dogs may be a multiple infection in which all the three parasites participate. [*Bartonella canis* infection in dogs should not be ignored.] Twelve cases were subjected to combined treatment with "tryparsamide" O and sulphapyridine, with nine recoveries and two deaths. [The history of the remaining case is not recounted.] The role of the dog as a carrier of tick-typhus infection in man in India has yet to be ascertained.—H. N. RAY.

STUBBS, E. L. (1944.) **Diseases of ducks.**—*Vet. Ext. Quart. Univ. Pa.* No. 96. pp. 11–15. **2394**

This is a brief account of some of the diseases causing losses amongst ducks in the U.S.A. Conditions mentioned are fowl cholera, salmonellosis and botulism. —J. D. BLAXLAND.

GLAZMAN, M. G. (1940.) Diferentsialnyĭ diagnoz po krovi skrytykh form leĭkoza, tifa i tuberkuleza u kur. **[Differential diagnosis by blood examination of latent forms of leucaemia, typhoid and TB. in fowls.]**—*Veterinariya, Moscow.* No. 4. pp. 83–88. **2395**

Since avian leucaemia appears to be transmitted through the egg, the early detection and elimination of infected chicks is desirable. Haematological data, including erythrocyte, total and differential leucocyte and thrombocyte counts and the haemoglobin content of normal blood and of blood from chickens suffering from leucaemia, typhoid and tuberculosis were compared. The incidence of leucaemia was correlated with abnormally high normoblast counts (5–10 per blood smear). Leucaemia diagnosed in this manner was subsequently confirmed by pathological evidence in 83% of the cases. —L. LEVENBOOK.

JONES, T. C., MAURER, F. D., & ROBY, T. O. (1945.) **The rôle of nutrition in equine periodic ophthalmia.** —*Amer. J. vet. Res.* **6.** 67–80. **2396**

The horses concerned in this investigation had been maintained for two years in areas practically devoid of grass but had been fed liberally on a ration consisting of oats, maize, timothy hay and bran, and most of the animals were in excellent condition. Attacks of iridocyclitis were frequently of long duration and lesions in the cornea were severe.

A comparison of the lesions of equine periodic ophthalmia with those of riboflavin deficiency in rats, man and dogs showed marked similarities. The

syndrome in the equine is initially characterized by photophobia, dimness of vision, epiphora, circum-corneal congestion, corneal vascularization and corneal opacities ; iridocyclitis with resultant posterior synechia, cataract, vitreous opacities or retinal detachment may supervene later. It is pointed out that the occurrence of such similar syndromes in different species suggests a common aetiology.

Estimation of the thiamine, riboflavin, nicotinic acid, pantothenic acid, pyridoxine, folic acid and biotin contents of various equine feeding stuffs showed that generally hays contain more riboflavin than do cereal grains but wide variation occurs in the same type of hay. Concentrates, with the exception of wheat bran, were generally found to be low in both riboflavin and nicotinic acid but high in pyridoxine. Thiamine was present in moderately high amounts in concentrates but was lower in roughage.

A considerable decrease in the ascorbic acid content was found in the ocular fluids of affected horses and analysis of other tissues showed that this decrease was limited to the eye. This depletion of ocular ascorbic acid was associated with increased intra-ocular vascular permeability which was demonstrated by means of a fluorescein test.

The authors suggest as an explanation for the lesions of equine periodic ophthalmia that a deficiency of dietary essentials, notably riboflavin, may influence the synthesis of ocular ascorbic acid which in turn may produce the lesions of periodic ophthalmia.—R. A.

*Romboli, B. (1942.) Infiammazione interstiziale a piccoli focolai in reni di ovino. (Nefrite interstiziale non suppurativa.) **[Localized interstitial inflammatory foci in the kidney of the sheep.]**—*Azione vet.* **11.** 195–199. [Abst. from abst. in *Jber. Vet.-Med.* **70.** 533.] **2397**

At the Pisa abattoir, many ovine kidneys were found to show a focal interstitial non-suppurative nephritis. The cause of the lesions was not determined, but they were not associated with sheep pox.

—E. Cotchin.

Assmann, R. (1944.) Auftreten des sogen. Herztodes des Schweines bei Grünfütterung und Weidegang. **[Relation of sudden fatal syncope in pigs to diet.]**—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* **52/50.** 86–87. **2398**

Three instances of pigs dying from sudden fatal syncope are recorded. Although it has been suggested that the disease is due to some dietary deficiency, the cases cited occurred in animals receiving varied and abundant food, with access to meadows and opportunity to root and to consume grass. In one case five sows died suddenly from syncope, and on P.M. examination, degeneration of the heart muscle was visible macroscopically. The remaining stock was sold ; the piggery was thoroughly disinfected, and remained empty for two months. After a second disinfection, new stock was introduced and no further deaths occurred.

In another case poisonous plants in the pasture were suspected, but denying the animals access to this pasture failed to prevent subsequent deaths. On the third farm, after 12 animals had died, fresh animals were introduced to replenish the stock, but these also died. It appears from these observations that the heavy losses which may occur in pigs from syncope are not due to a dietary deficiency or lack of exercise. Appropriate prophylactic and therapeutic measures have not yet been discovered. As a rule the disease occurs in piggeries where the animals are in close contact with one another, and A. inclines to the view that an infection is the primary cause. [The atmospheric conditions at the time when deaths occurred are not mentioned, so that the possibility of "heat stroke" cannot be excluded.]—E. M. Cruickshank.

I. Temperton, H., & Bythell, D. W. P. (1944.) **Six-day chick disease.**—*Vet. Rec.* **56.** 409–412. [Reprinted in *Harper Adams Util. Poult. J.* **29.** 60–67.] **2399**

II. Common, R. H., Kerr, W. R., & Lamont, H. G. (1945.) **Six-day chick disease.**—*Vet. Rec.* **57.** 45–46. **2400**

I. The authors first encountered this condition during the 1942–43 hatching season, when heavy losses which could not be attributed to any known cause occurred among baby chicks. During the 1943–44 season, the disease appeared to be more widespread and losses were heavier, reaching 80% in some cases.

Mortality varied from 25% to 50% or higher per batch of chicks, losses commencing when chicks were 6 days old and continuing until the survivors were 12–14 days old, with a peak mortality on the 8th, 9th and 10th days. In other respects, hatching and rearing were satisfactory, the survivors growing well and reaching maturity at a normal age. There were no characteristic symptoms, the length of time between onset of symptoms and death varying from one to six hours. P.M. findings were not consistent and bacteriological examinations yielded negative results.

From field observations carried out on 55 farms, it appeared that six-day disease occurred only on farms where chicks were reared on an all-mash diet and that various types of grain fed from hatching as a supplement to chick mash appeared to confer a degree of protection.

Experimental feeding as a result of these field observations showed that 30% ground wheat with 70% control mash, ground wheat alone, and crushed oats alone, all gave a degree of protection. In another test, when chicks were given free access to both crushed oats and control mash, deaths between the 6th and 14th day amounted to 4% only, as against 24% in the control group fed solely on control mash. The control mash in these experiments was not dissimilar in respect of principal chemical constituents to a pre-war chick starter mash and might have been expected to yield similar results. It was thought that the only outstanding common factor in all grains which might have prevented the condition, was their richness in starch, upon which the fowl relies for the bulk of its energy requirements. In a final test, the authors appeared to prove this contention, by replacing 30% of the control mash with an equivalent weight of pure crystalline glucose-D. The mortality was 11% as compared with 40% in the chicks fed solely on the control mash.

The authors concluded that six-day disease was due to a deficiency of available energy in all-mash chick starter rations, death occurring at the sixth day when the material provision of energy through the yolk sac was exhausted. Contributory factors thought to be responsible were the war-time shortage of maize, maize products, and other grains, together with the deterioration of millers' offals under war-time milling conditions, and the inferior quality of other cereal products permitted for poultry feeding.

[This account of six-day chick disease agrees in all but minor details with the experiences of other workers, except that some of them report having encountered a similar condition several years earlier—see II. It is of interest to note in support of their conclusions, that six-day disease was practically unknown during the 1944–45 hatching and rearing season and that this coincided with the introduction of 20% maize meal to the National chick mash.]

II. The authors, whilst in agreement with the

views expressed in I concerning the control of six-day chick disease, regard the problem as essentially physiological rather than pathological or nutritional and doubt whether the condition is a specific disease. They met the condition in Northern Ireland in 1929 and at various times since in groups of chicks fed on a wide range of experimental rations, many of which were in all respects quite satisfactory.

In one series of nutritional experiments in 1943–44, small-scale laboratory trials using the same rations and chicks from the same hatching were conducted at the same time as field trials. The only possible differences between the field and laboratory trials were those associated with environmental conditions, the field groups being reared in brooder houses under oil-heated hovers, whereas the laboratory groups were reared in electrically heated brooders under equable laboratory conditions. In three series of parallel experiments, heavy mortality, attributed to six-day disease, occurred in the field but not in the laboratory groups. The authors therefore concluded that in these trials the effect of brooding temperature had been important.

—J. D. Blaxland.

Caussé, R. (1942.) Sur l'otite, chez la souris blanche. **[Otitis in white mice].**—*C. R. Soc. Biol. Paris.* **136.** 726–727. **2401**

No previous work seems to have been done on spontaneous otitis in mice. In albino rats, rabbits, g. pigs and certain birds it is common and frequently complicated by labyrinthitis. From C.'s observations the incidence in white mice seems to be about 1% and labyrinthitis is very rarely encountered. When occurring, this seems to be an extension from the pharynx and not from a parasitic or bacterial otitis of the external ear. After experimental infection, bilateral otitis generally develops. Among 150 mice having undergone unilateral removal of the incus none showed signs of posterior labyrinthitis.—H. I. Field.

—. (1944.) **Discussion on the limitations and uses of the comparative method in medicine. IV. Neurology and psychiatry.** [Speakers :– Jones, E., Russell, D. S., Innes, J. R. M., Gordon, W. S., Andrews, W. H., & Oakley, C. L.]—*Proc. R. Soc. Med.* **37.** 651–658. [For part III, see *V. B.* **15.** 199.] **2402**

This is the fourth discussion in the symposium arranged as the programme of the Section of Comparative Medicine, Royal Society of Medicine, for 1943–44.

Jones, speaking on psycho-analysis and comparative physiology, said that the deep prejudice of man against recognizing his kinship with the animal world was only partly overcome by acceptance of the theory of evolution. In this a compromise had been reached, it being agreed that man's body though not necessarily his mind may have been derived from non-human origins. The findings of psycho-analysis were carrying the theory of evolution through to its logical conclusion : both mind and body were being treated from a genetic point of view. Despite recognition of the " ego " and the " id ", we were unfortunately still far from being able to define the primitive mental elements that would enable us to tackle the obscure problems of mental heredity from the genic viewpoint. The old term " instinct ", however much it might be criticized, stood for something real which was still in need of definition. Psycho-analysis could present many studies in the field of instinct that should be of significance to the comparative physiologist. In the epochal struggle between the two principles of, on the one hand, massive fertility combined with an enormous mortality in offspring, and the opposite one of a lower mortality combined with greater parental care and often an associated delay in individual development, the latter principle would seem to be winning the day were it not for the impressive recrudescence of unicellular organisms and their pathological effects on larger creatures.

In the mental field the pleasure-pain principle was of much more comprehensive scope than psychologists had once thought. It was important to determine whether the functioning of individual organs and cells was determined solely by criteria of biological advantage, as was generally assumed, or whether it had to contend with physical tendencies comparable to the pleasure-pain ones of the mental field. Brun and other biologists had produced evidence, chiefly in insects, of cases where organic search for pleasure had overwhelmed other tendencies with most deleterious, or even fatal, results to the species concerned. It was a thought that, even on the practical plane, was well worthy of consideration by those whose work was concerned with animal life.

Russell reviewed advances in the field of comparative neuropathology under the headings of developmental abnormalities, trauma, degenerations, virus diseases, intoxications, vitamin deficiencies, tumours and therapeutic trials. Innes recalled that work on animal virus encephalitides had contributed greatly to an understanding of encephalitis and the neurotropic viruses in man. He believed that in studies of animal brain, there had been too rigid a view of normality and many of the changes which had been described in the nerve cells of these brains might be devoid of pathological significance. The precocious development of the nervous system in lambs, illustrated by Barcroft's studies with embryos, threw doubt on the view that myelination of tracts determined the onset of function. In cows and sheep, melanin pigmentation was found normally in the central nervous system (mostly pial) with a frequency and degree rarely found in man. The occurrence of siderosis was another peculiar pathological manifestation which seemed to vary from animal to animal.

Gordon discussed louping-ill and scrapie and stated that, in confirmation of the findings of Rivers, he and his colleagues had found neutralizing antibodies in the serum of ten laboratory workers who had been in intimate contact with the virus and in whom illness, sometimes of a serious nature, had occurred prior to examination of the serum, while D. R. Wilson had more recently isolated louping-ill virus from two laboratory workers believed to be suffering from the disease. It was probable that natural cases also occurred in man since a serum sample sent by Dr. J. Smith of Aberdeen from a sheep farmer suspected to have been affected by the disease was found to contain antibody capable of neutralizing the virus.

Andrews discussed the effects on the nervous system of cattle of *Matricaria nigellaefolia* intoxication. Oakley expressed surprise at the fact that Hurst had been so successful in recovering distemper virus from cases of encephalomyelitis in dogs. He himself had been completely unsuccessful, as had Perdrau and Pugh. As distemper virus could be recovered readily from a form of cerebral distemper showing degeneration of nerve cells and neuronophagy, he suspected that more than one disease was involved and that distemper merely activated another latent infection.—A. N. Worden.

Biester, H. E., & Schwarte, L. H. (1944.) **Factors to be considered in conditions causing clinical manifestations of central nervous disturbances.**—*Vet. Med.* **39.** 303–307. **2403**

The diagnosis of conditions characterized by derangement of the central nervous system is discussed under the headings of virus diseases, bacterial diseases,

intoxications, deficiencies and miscellaneous conditions.

A study of the histology of the changes in nerve tissues is of great value in identifying the various conditions, but widely different causes may produce similar effects. The symptoms, lesions and pathology of listeriasis in sheep, although the disease is caused by a bacterium, resemble very closely those of the virus diseases louping-ill and equine encephalomyelitis, with which it was at first confused. Perivascular cuffing, focal infiltration and nerve cell degeneration may occur in both virus and bacterial infections. In an outbreak of pasteurellosis in sheep with localization in the brain, although the histology of the brain lesions was different, the history and clinical manifestations bore a striking resemblance to those of listeriasis. The clinical similarity between leuco-encephalomalacia (mouldy maize poisoning) and E.E. is striking, although the brain lesions, *viz*, numerous haemorrhages, oedema and areas of liquefaction, are quite different.

That similar causes may produce different effects in different species of animals is illustrated by the toxicity of mouldy maize for horses and its apparent harmlessness for cattle and pigs; on the other hand, maize injured by drought may be toxic for cattle but harmless to horses. Mouldy or decayed maize silage from the top layers of trench silos may cause acute nervous symptoms in horses and yet be harmless for cattle.

The diagnosis of nervous disturbances due to nutritional deficiencies is difficult and is based on the elimination of virus or bacterial infections and an evaluation of the ration.

This paper is of special value to the field officer. —M. C.

KELLY, F. C. (1944.) **Bacteriology of artificially produced necrotic lesions in the oropharynx of the monkey.**—*J. infect. Dis.* **74.** 93–108. [Author's summary copied *verbatim.*] **2404**

In experimental necrotic lesions anaerobic bacteria, especially fusiform bacilli and vibrios, increased at the expense of the aerobes, and replaced the predominating cocci of the normal oropharyngeal flora. An increase of spirochetes was not an inevitable accompaniment to the transition from the healthy mucous membrane to the necrotic tissue. When there was an occasional high spirochete content, smears from the lesions resembled those from human cases of Vincent's angina. Bits of the artificially produced, necrotic membrane caused abscess formation and necrosis, but no fetid suppuration characteristic of fuso-spirochetal disease, when implanted subcutaneously into laboratory animals. There was never a progressive necrosis extending from the experimental lesions. The normal bacteria of the monkey's oropharynx did not act as "opportunists" when provided with injured and necrotic tissue in which some grew for as long as 13 weeks.

The two organisms which predominated in the lesions were a "crescent fusiform" bacillus, resembling *Fusiformis dentium*, and an anaerobic vibrio which developed into long spirilla in cultures. This pleomorphic vibrio, identified as the *Spirillum sputigenum* of Miller, was non-pathogenic for healthy laboratory animals, but produced local inflammation and abscesses in vitamin C deficient guinea pigs.

Organisms identified as *Bacillus funduliformis* or *Bacterium necrophorum* were not found in the healthy oropharynx of the monkey, nor did they appear in necrotic lesions artificially produced in that region, although *Bact. necrophorum* has been recovered from similar lesions in the colon of the same animal.

Evidence has been presented that local tissue injury is not in itself sufficient to increase the pathogenicity of organisms normally living in the monkey's buccal cavity.

CAVELTI, P. A., & CAVELTI, E. S. (1945.) **Studies on the pathogenesis of glomerulonephritis. I. Production of autoantibodies to kidney in experimental animals.**—*Arch. Path.* **39.** 148–152. [Authors' summary copied *verbatim.*] **2405**

Evidence is presented by means of experiments in rabbits and rats that group A beta hemolytic streptococci are able in some way to render renal material antigenic in the same species. The antibodies to kidney produced by immunization with combinations of streptococci and homologous kidney were demonstrated by several serologic methods in vitro.

ATKESON, F. W., ELDRIDGE, F., & IBSEN, H. L. (1944.) **Prevalence of "wrytail" in cattle. Further studies on the prevalence and mode of inheritance of wrytail in cattle.**—*J. Hered.* **35.** 11–14. **2406**

Observations were made on the occurrence of wrytail in 10 Jersey herds representing 350 animals. Among the 350 animals, 117 were wrytailed. An analysis of the mode of inheritance of the character indicated that it is inherited as an autosomal recessive. Of the 117 wrytailed animals, 64 were set to the right and 51 to the left, and two with direction unknown. The evidence indicates that the direction of the tail-set is non-genetic in character. The wrytail character has also been observed in the Brown Swiss, Guernsey, Holstein and Ayrshire breeds, but probably occurs less frequently in these breeds than in the Jersey. There was evidence that the character is inherited, but sufficient data were not available to determine whether the mode of inheritance was the same as in the Jersey.—N. J. S.

BURROWS, H. (1945.) **The occurrence of perineal hernias in untreated male mice of the C_{57} Black strain.** —*Yale J. Biol. Med.* **17.** 567–570. [Author's summary copied *verbatim.*] **2407**

The spontaneous occurrence of perineal hernias containing enlarged seminal vesicles is reported. The condition has been found only in mice of the C_{57} Black strain. The males of this strain, but not the females, are apt to have pronounced degeneration of the adrenals, though their general health does not seem to be impaired thereby. The mice with hernias became infertile at an abnormally early age.

See also abstr. **2409** (piglet anaemia), **2469** (retained placenta in cows), **2477** (livestock disease research in Great Britain), **2480**, **2481** (in the U.S.A.), **2478** (diseases of sheep in Scotland).

NUTRITIONAL AND METABOLIC DISORDERS

KUIKEN, K. A., MCCOY, R. H., SCHULTZE, M. O., & KING, C. G. (1944.) **Simplified diets for the guinea pig.**—*J. Nutrit.* **27.** 385–394. [Authors' summary copied *verbatim.*] **2408**

Growth and survival of guinea pigs for long periods of time on simplified diets containing not more than 5% of crude vitamin concentrates are reported.

The basal simplified diet was developed through systematic replacement of the natural foods in a satisfactory ration. With equivalent amounts of protein, carbohydrate, fat, and minerals, the diet was not adequate when supplemented with known vitamins.

The authors interpret the data presented as indicating that at least two unknown dietary essentials are required to complete the diet of the guinea pig. When commercial casein provides the protein of the diet, small supplements of rice polish concentrate, brewers' yeast, liver extract, skim milk powder or dried grass

markedly improve both survival and growth, thus demonstrating the presence of one of these essentials. However, if "vitamin-free" casein is used, these supplements, even in large amounts, have very little, if any, beneficial effect upon growth or survival, providing evidence for another factor in commercial casein.

ALIKAEV, V. A., & VASIL'EVA, E. N. (1940.) Podkozhnye inektsii krovi materi kak sposob profilaktiki anemii porosyat-sosunov. **[Subcutaneous injection of the blood of the sow in the treatment of piglet anaemia.]**—*Veterinariya, Moscow.* No. 5. pp. 88–93. [French summary.] **2409**

Anaemic piglets, 6–36 days old, were injected subcutaneously 1–3 times, with up to 10 ml. per injection of sow's blood. In certain cases, ferrous sulphate was also given. Erythrocyte counts, haemoglobin concentrations and weights of the injected piglets as compared with untreated controls led the authors to recommend their method.—L. LEVENBOOK.

SCOTT, E. M., & MCCOY, R. H. (1944.) **Iron in anemic rat tissues.**—*Arch. Biochem.* **5.** 349–355. **2410**

Rats reared on a milk diet were divided into four groups: normal, Cu-deficient, Fe-deficient, and Fe-deficient followed by Fe therapy. They were analysed for free and total iron in the tissues, and the amounts of blood Fe, stored Fe and tissue Fe were calculated.

From the total increase of blood Fe during five days' therapy it is estimated that the average time for the formation of a red cell is 40–100 min. Deficiency of Cu in the diet leads to early mortality, impaired growth, and hypertrophy of the liver and spleen, and the anaemia associated with it is only one of several ill-effects; no evidence was obtained of a specific role for Cu in Fe metabolism. Stored iron in all tissues, analysed by its reaction to thiocyanate, is stated to be present as FeOOH although the evidence for this is not given in the present paper.—A. EDEN.

GEYER, R. P., RUPEL, I. W., & HART, E. B. (1945.) **Cobalt deficiency in cattle in the north eastern region of Wisconsin.**—*J. Dairy Sci.* **28.** 291–296. **2411**

Cattle in N.E. Wisconsin gave evidence of Co deficiency, characterized by unthriftiness and anaemia. The condition was corrected by feeding salt containing 1 oz. $CoSO_4.7H_2O$ per 100 lb. incorporated into the grain ration at a level of 1%, supplying 3 mg. of Co per 5 lb. of grain consumed. Good results also attended the daily administration of one teaspoonful of a solution of cobaltous sulphate or chloride containing 1 oz. per gal. of water.

The normal range of Hb in the blood of cows, heifers and calves in this region lay between 9·5 and 12·5 g. per 100 ml. The tolerance for Co was high; levels of 50 mg. Co per day for two months produced no evidence of polycythaemia.—A. EDEN.

HARRIS, L. E., BASSETT, C. F., SMITH, S. E., & YEOMAN, E. D. (1945.) **The calcium requirement of growing foxes.**—*Cornell Vet.* **35.** 9–22. **2412**

Groups of young silver foxes reared on diets containing from 0·16 to 0·51% Ca (dry matter basis) were compared for growth rate, mineral content of the bones and the value of the pelts. On diets low in Ca, symptoms of a Ca deficiency developed which included lameness, tetany, crooked legs, oedematous swelling of the muzzle and enlarged cranial bones. Food consumption and live weight increase were correlated positively with the Ca content of the diet.

Analyses of the humori were made for ash and Ca contents and specific gravity. On a diet containing 0·41% Ca, the ash analyses were as good as those on a 0·51% Ca level, but two-thirds of the animals showed marked Ca deficiency at the period of most active growth and more than one-third had crooked legs at pelting time, suggesting that for normal bone growth the diet should contain not less than 0·5% Ca on the dry basis. Foxes on the lower Ca diets showed small pelts due to lack of body growth and there was evidence of the pelts being rubbed due to the crippled condition of the animals. At the higher level of 0·51% Ca, foxes housed in furring sheds had superior pelts to those maintained in outside breeding pens although there was greater evidence of fur chewing in the indoor group.—A. EDEN.

PETERSON, E. H., MORRILL, C. C., & GRAHAM, R. (1945.) **Embryo mortality accompanied by pasty eyes and severe losses in ducklings associated with avitaminosis.**—*Amer. J. vet. Res.* **6.** 96–102. **2413**

A high incidence of embryo mortality in successive hatches, followed by an abnormally high death rate in newly hatched ducklings, occurred on a large duck farm after feeding a commercially prepared pelleted food to both breeding stock and ducklings for about six weeks. The losses stopped when a different food was supplied. The breeding stock was not materially affected and egg production and fertility fell only slightly.

Symptoms in affected ducklings were weakness, incoordination, blindness in some and in others a watery discharge of the eyes. Bacteriological examinations were negative but vitamin A and carotene estimations on plasma and livers showed that the levels were much lower in affected than in normal ducklings. Histological examination showed metaplasia of the nasal respiratory epithelium to a stratified squamous type and hyperkeratization was frequently noted.

The addition of wheat-germ oil and of cod liver oil to the pellets for two respective groups of ducklings, resulted in a somewhat higher survival rate in the cod liver oil group as compared with a control group and with the group getting the wheat-germ oil.

It is suggested that the losses were due to a deficiency of vitamins A and E as a result of oxidative losses of these vitamins from rancidity in the pelleted feed. —R. ALLCROFT.

SHAW, J. C., MATTERSON, L. D., SURGENOR, M. E., & HOURIGAN, C. A. (1945.) **Studies on ketosis in dairy cattle. VI. Is ketosis in dairy cattle due to a vitamin A deficiency?**—*J. Amer. vet. med. Ass.* **106.** 285–291. [For part V, see *V. B.* **15.** 20.] **2414**

Eight definite cases of post-parturient hypoglycaemic ketosis in dairy cows were treated for periods up to three weeks with oral doses of 1–4 million I.U. of vitamin A, with entirely negative results. The blood plasma carotene levels in these cases ranged from 131 μg. % to 768 μg. %, the plasma vitamin A levels from 14 μg. % to 34 μg. %, and both lay within their normal range. Ketosis in dairy cattle is certainly not the result of vitamin A deficiency and the most efficacious methods of treatment are turning the affected animal out to pasture, or injecting intravenously massive doses of glucose at frequent intervals.—A. B. PATERSON.

DRILL, V. A., & BURRILL, M. W. (1944.) **Effect of thiamin deficiency and controlled inanition on ovarian function.**—*Endocrinology.* **35.** 187–192. **2415**

It has been shown by previous workers that after a few normal oestrous cycles, rats fed on a thiamine-free diet pass into anoestrus. The authors produce evidence that the ovarian hypofunction is due not to thiamine deficiency *per se* but to the resulting inanition. Fifteen normal female rats placed on a diet adequate in all respects except for the absence of thiamine, rapidly lost weight as a result of reduced food intake, although food was allowed *ad lib.*, and oestrous cycles

ceased within 16–24 days. A second group of fifteen rats was given the same diet but with adequate thiamine supplement. The food consumption for each rat in this group was, however, limited to the average quantity consumed by the thiamine-deficient group on the previous day. These rats also passed into anoestrus despite adequate thiamine administration. The ovaries of both the thiamine-deficient rats and their inanition controls responded to injections of gonadotropin, indicating that diminished gonadotropic function of the pituitary was the primary cause of the ovarian hypofunction.—ALFRED T. COWIE.

WATSON, C. J., & LAYNE, J. A. (1943.) **Studies of urinary pigments in pellagra and other pathological states. I. Clinical observations. II. Excretion of porphyrin and urorosein reaction in dogs with experimental blacktongue.**—*Ann. intern. Med.* **19.** 183–199 & 200–205. **2416**

SCHWARTZ, S., MARVIN, J. F., LAYNE, J. A., & WATSON, C. J. (1943.) **Studies of urinary pigments in pellagra and other pathological states. III. Certain toluene-soluble pigments of human and canine urine.**—*Ibid.* 206–212. **2417**

I. The chromogen giving the urorosein reaction is probably indole-acetic acid which is present in normal urine. In abnormal urines an oxidizing agent may be present in the urine so that a spontaneous urorosein reaction occurs.

II. The spontaneous urorosein reaction was not given by urine from dogs suffering from blacktongue. The reaction appears to be independent of the dietary nicotinic acid state of animals. The toluene used as preservative of the urine became coloured with coproporphyrin but coproporphyrin excretion is not raised in blacktongue.

III. The red toluene-soluble pigment from urine is a mixture of several substances, two of which are similar to indirubin.—E. BOYLAND.

ROBINSON, H. J., & SIEGEL, H. (1944.) **The influence of B vitamins on the resistance of rats to induced pneumococcal lobar pneumonia.**—*J. infect. Dis.* **75.** 127–133. [Authors' summary copied *verbatim.*] **2418**

Rats deficient in riboflavin or pantothenic acid are as resistant to experimentally induced pneumococcal lobar pneumonia as rats receiving the same basal diet supplemented with adequate quantities of riboflavin or pantothenic acid. Thiamin and possibly pyridoxin deficiency appeared to lower the resistance of rats to this infection somewhat if compared to the group receiving the same basal diet plus all the B vitamins. With the exception of thiamin deficiency, all deficient groups, including those on a complete synthetic diet deficient in unknown factors, showed a greater resistance to infection than rats fed the normal stock diet *ad libitum.* Inanition had no apparent influence on the resistance of rats. There was essentially no difference in the rate or degree of growth of pneumococci added to the blood of deficient or healthy rats.

MAWSON, E. H., & KON, S. K. (1945.) **Vitamin-C content of milk as consumed.**—*Lancet.* **249.** 14–15. [Authors' summary copied *verbatim.*] **2419**

The mean vitamin-C content of 71 samples of raw milk obtained from consumers was $1{\cdot}34 \pm 0{\cdot}055$ mg. per 100 ml., and that of 75 samples of heated milk was $0{\cdot}69 \pm 0{\cdot}043$ mg. per 100 ml. The vast majority of samples in the latter group were pasteurised by an official method. The difference is considered to be largely due to factors other than the heat treatment. High Temperature Short Time pasteurisation of milk causes only slight destruction of vitamin C.

See also absts. **2323** (nicotinic acid), **2390** malnutrition in Indian cattle), **2396** (diet and equine periodic ophthalmia), **2398** (diet and fatal syncope in pigs), **2399** (diet and six-day chick disease), **2436** (effect of sex hormones on plasma ascorbic acid), **2468** ("folic acid").

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

FOLLEY, S. J., & MALPRESS, F. H. (1944.) **The artificial induction of lactation in the bovine by the subcutaneous implantation of synthetic oestrogen tablets.**—*J. Endocrinol.* **4.** 1–18. **2420**

Twenty-four heifers, 14 cows and 2 hermaphrodite heifers, all barren, were used in these experiments. Two synthetic oestrogens, diethylstilboestrol and *meso*-hexoestrol, were implanted subcutaneously in tablet form. Four sizes of tablet (15, 25, 50 and 1,000 mg.) were used and the total quantity of oestrogen implanted into each animal was either 2·5 or 5·0 g. The duration of treatment varied from 31 to 161 days. Copious lactation was induced in approximately 50% of the animals treated. Individual variations in response were large; in some cases the lactation curve was comparable with that of normal lactation, the maximum daily yields varying from ½ to 30¼ lb. and the total lactation yields from 50 to 7,400 lb. No difference in efficacy was noted between the two oestrogens or the two dose levels. In ten cases the large tablets (1,000 mg.) were employed, 1–5 of these being implanted. The implantation and removal was easier in the case of these tablets than in the case of large numbers of small tablets, many of which fragmented and migrated *in situ.* Considerable lactational responses were obtained from four of the animals treated with these large tablets.

The mean daily absorption of oestrogen was 8·0–23·9 mg. From consideration of the lactation and tablet absorption data, the authors concluded that there was no advantage in using implants giving a daily absorption of more than about 12 mg. oestrogen per day, or in leaving the tablets *in situ* once the lactation curve had reached its peak, usually 5–10 weeks after the implantation.

During the period of implantation most of the animals showed nymphomaniac symptoms of varying degree; in some 20% of the cases this culminated in fracture of the pelvis which is believed to have occurred during coital mimicry and which probably could have been avoided by keeping the treated animals in isolation.

The ovaries became inactive during the period of implantation, probably as a result of inhibition of pituitary gonadotropic function by the relatively high daily absorption of oestrogen. Ovarian periodicity was renewed some two months after cessation of treatment; this was sometimes preceded by a crop of cystic follicles.

Nine heifers and two cows were subsequently mated; one became pregnant.

The various hormonal factors involved in the induction of lactation and their bearing on the wide variation in responses obtained, are discussed.—A. T. C.

FOLLEY, S. J., & MALPRESS, F. H. (1944.) **Artificial induction of lactation in bovines by oral administration of synthetic oestrogens.**—*J. Endocrinol.* **4.** 23–36. **2421**

The oral administration of synthetic oestrogens for the induction of lactation presents several practical advantages over implantation. To investigate the possibility of this method, eight heifers were given daily

doses of hexoestrol, dienoestrol, or diethylstilboestrol in their food or drinking water. The total doses were 3·3–18·2 g. The maximum daily milk yields varied from 4½ to 18 lb.; the total recorded yields ranged from 501 to 3,689 lb. As this preliminary experiment indicated that lactation could be satisfactorily induced by oral administration, further investigation was carried out with 32 normal heifers. Diethylstilboestrol and dienoestrol were fed in doses of 50 and 200 mg. per day. During the experiment it was found necessary to double the lower dose, but even then the results were much less encouraging than in the first experiment. Only 19 of the heifers came into lactation. The maximum daily yields ranged from 2¼ to 16¾ lb., the total recorded yields from 127 to 2,296 lb. The onset of lactation was very slow and the milk yields were inferior to those obtained by tablet implantation although much more oestrogen was required to evoke them, the total quantities of oestrogen administered per heifer varying from 8·1 to 32·2 g.

The ovaries were palpated at regular intervals; within two months of the beginning of treatment those of all the heifers had become inactive. Activity returned about two months after the cessation of treatment. Nymphomania was not marked and no fractures of the pelvis occurred, but two heifers had to be slaughtered owing to vaginal and rectal prolapse. Of 30 animals mated after the experiment, 27 became pregnant.

Possible reasons for the unsatisfactory milk yields are discussed: a probable factor may have been the age of the heifers, most of which were under two years of age whereas the animals in the preliminary experiment and the implantation experiments were at least three years old.

It is estimated that only about 10% of the oestrogen administered was utilized. Destruction in the rumen is believed to account for part of this loss. Further research is required to increase the efficiency of utilization of synthetic oestrogens when administered orally to ruminants.—ALFRED T. COWIE.

FOLLEY, S. J., STEWART, D. L., & YOUNG, F. G. (1944.) **Experiments on the use of tablets containing 50% hexoestrol for the artificial induction of lactation in the bovine.**—*J. Endocrinol.* **4.** 43–52. **2422**

The authors investigated the possibility of using, as implants, tablets of synthetic oestrogen containing a soluble excipient. It was thought that these tablets might be completely absorbed by the end of the treatment period, thus obviating the second operation required to remove the unabsorbed portions of the implant when pure oestrogen tablets are used.

Eight heifers and four cows were implanted subcutaneously with tablets containing 50% hexoestrol, 49% lactose and 1% stearic acid. Two sizes (50 and 250 mg.) of tablet were used and the total implants weighed either 0·5 or 2·0 g. Lactational responses varied greatly; only two heifers and one cow gave satisfactory yields. The six heifers which gave only small amounts of milk were given supplementary implants of pure hexoestrol tablets. In two cases this produced marked improvement in the yields. The maximum daily yield varied from nil to 25½ lb., the total recorded yields from nil to 6,928 lb. Symptoms of nymphomania were observed in all animals but no fractures of the pelvis occurred. Of six animals retained for breeding, five became pregnant.

Contrary to expectation the excipient tablets were absorbed significantly more slowly than tablets of pure oestrogen, and surgical removal at the end of the period of treatment was still necessary.—ALFRED T. COWIE.

FOLLEY, S. J., & MALPRESS, F. H. (1944.) **The chemical composition of bovine mammary secretions induced by the subcutaneous implantation or oral administration of synthetic oestrogens.**—*J. Endocrinol.* **4.** 37–42. **2423**

The changes in milk composition were studied in 23 heifers which had been brought into lactation by the administration of synthetic oestrogens, either orally or by tablet implantation. The data include values for fat, non-fatty solids, total nitrogen, casein nitrogen, non-protein nitrogen, lactose and chlorine, at intervals up to and over the 100th day of lactation. In a large number of cases the phosphomono-esterase A_1 activity was also measured.

The earliest secretions were invariably colostral in general character, being characterized by high non-fatty solids and low fat percentages, but their composition changed to that of normal milk at a rate roughly proportional to the rate of increase in yield. It was concluded that in general a daily yield of 5 lb. and often less, could be regarded as a guarantee of normal milk composition. The milk was of excellent quality and well suited for human consumption.—A. T. COWIE.

PARKES, A. S., & GLOVER, R. E. (1944.) **Induction of lactation in heifers by a single injection of esters of diethylstilboestrol.**—*J. Endocrinol.* **4.** 90–102. **2424**

Since synthetic oestrogens are absorbed more slowly when injected in the form of their aliphatic esters it was decided to investigate the possibility of inducing lactation in heifers with a single injection of diethylstilboestrol in ester form. This method of treatment, if results were satisfactory, would be simpler than either tablet implantation or oral administration. A total of 24 normal heifers under two years of age were treated with one or more of the following esters of diethylstilboestrol: dipropionate, di-*n*-butyrate, dicaprylate, dicaprate, dilaurate and dipalmitate. The simultaneous injection of a slowly acting and a rapidly acting ester appeared to be most effective. The best yield, averaging 13 lb. per day, was obtained in a heifer injected with 0·25 g. dilaurate and 0·25 g. dipropionate. The results obtained with this combination of esters are considered by the authors, after making allowance for the size and age of the heifers, to equal those obtained with tablet implantation. Of 16 heifers mated after the experiment, 10 became pregnant.—ALFRED T. COWIE.

LAWSON, W., STROUD, S. W., & WILLIAMS, P. C. (1944.) **Oestrogen excretion in milk from oestrogenized cattle.**—*J. Endocrinol.* **4.** 83–89. **2425**

Only very small quantities of oestrogen are excreted in the milk of heifers treated with synthetic oestrogens. This was shown by extracting several litres of milk and assaying them by subcutaneous injection or intravaginal application in ovariectomized rats. The maximum concentration of oestrogen found was 0·5–1·0 μg. per pint, the average was much less.

Single assays on the blood and urine of a heifer receiving 20–24 mg. dienoestrol orally per day revealed a concentration of 5 μg. per litre dienoestrol in the blood and 2 mg. per litre in the urine.—ALFRED T. COWIE.

HAMMOND, J., Jr., & DAY, F. T. (1944.) **Oestrogen treatment of cattle: induced lactation and other effects.**—*J. Endocrinol.* **4.** 53–82. **2426**

One hundred and forty barren cows and heifers were treated with synthetic oestrogens, in most cases by the subcutaneous implantation of diethylstilboestrol and hexoestrol tablets. Certain animals received supplementary injections of either diethylstilboestrol or one of its esters or of chorionic and pregnant mare serum gonadotropins. Intraperitoneal implantations were also used.

The effects of the treatments on mammary development, lactation, ovarian function and the general behaviour of the animals were studied.

The milk yields varied greatly, ranging from no response to a total yield of 9,808 lb. Throughout the treatment period the ovaries were quiescent; on removal of the implants, ovulation was again resumed and in some cases was preceded by a transient period of follicular cysts. It was noted that in animals in which the corpus luteum persisted after implantation, the milk yield was small until the corpus luteum died out or was removed. The presence of a corpus luteum also prevented the development of persistent oestrus and nymphomaniac symptoms which appeared in most treated animals. Several pelvic fractures occurred in addition to various minor injuries as a result of the abnormal behaviour of the animals.

The relationships between the physiological developments relating to lactation following pregnancy and those which occur during oestrogen implantation are compared and discussed.—ALFRED T. COWIE.

GREENBERG, D. M., AIRD, R. B., BOELTER, M. D. D., CAMPBELL, W. W., COHN, W. E., & MURAYAMA, M. M. (1943.) **A study with radioactive isotopes of the permeability of the blood-cerebrospinal fluid barrier to ions.**—*Amer. J. Physiol.* **140.** 47–64. **2427**

Studies were made of the permeability of the barrier between the blood and the cerebrospinal fluid to various ions by the use of radioactive isotopes, employing dogs as the experimental subjects. The rate of disappearance of injected ions from the blood plasma decreased in the order, K, Rb, PO_4, I, Na, Br and Sr. Calculations of the plateau concentrations of Na and Br in the plasma suggested that these injected ions became uniformly distributed throughout the extracellular fluids of the body. Sr was at first rapidly distributed among the extracellular fluids and then slowly taken up by the body tissues, mainly by the skeletal system. Injected phosphate was taken up principally by the mineral matter of the bone and by the intracellular phase of the soft tissues to be converted into various organic esters. [Rb = rubidium.]

The rate of increase in concentration of the labelled ions in the C.S.F. was in descending order K, Na, Br, Rb, Sr, PO_4, I. Concentrations of K, Rb, and PO_4 in the C.S.F. reached maxima within 20–60 min.; Sr showed a less pronounced maximum and Na showed no peak in the C.S.F. concentration curve.

The C.S.F. to plasma concentration ratios were lower for Rb than for K, suggesting that the C.S.F.-blood barrier is less permeable to Rb than to K. Permeability of the barrier to halides appears to decrease in the order Cl, Br, I.

The evidence of hindrance of the free passage from the blood to the extracellular fluid of the central nervous system is strongly presumptive that the exchange between the blood and brain takes place by a process of secretion rather than by straightforward diffusion or ultrafiltration.—A. EDEN.

HOLDEN, H. F. (1943.) **The blood pigment and cyanides; a green haemoglobin.**—*Aust. J. exp. Biol. med. Sci.* **21.** 159–168. [Author's summary copied *verbatim*.] **2428**

The preparation and some properties of a green derivative of haemoglobin are described. Its ultra-violet and visible spectrophotometric curves are recorded. The bearing of this substance on the evidence for the existence of cyanhaemoglobin is discussed.

MAJUMDAR, D. N., & DAS GUPTA, C. R. (1944.) **Haematological studies in *Silenus* (*Macacus*) *rhesus*. Part I. The blood picture of the normal monkey.**—*Indian J. med. Res.* **32.** 101–104. **2429**

Results are given of a study of the normal blood picture of 59 rhesus monkeys. Average haematological values were: erythrocytes, 5·76 million per cu. mm.; leucocytes, 15,380 per cu. mm.; haemoglobin, 13·59 g. per 100 ml.; cell volume, 44·98%; mean corpuscular volume, 78·51 cu.μ; mean corpuscular haemoglobin, 23·84 $\mu\mu$g.; mean corpuscular haemoglobin concentration, 30·4%, and reticulocytes, 1·19%. Average values of differential and absolute white cell counts were: neutrophiles, 48·3% or 7,270 per cu. mm.; lymphocytes, 47·9% or 7,210 per cu. mm.; monocytes, 1·61% or 242 per cu. mm., and eosinophiles, 2·2% or 328 per cu. mm.

These values are compared with those obtained by other workers with *Macaca mulatta* and *M. sinicus*.
—M. M. HUQ.

RADKEVICH, P. E. (1940.) K voprosu o reservnoĭ shchelochnosti i ostatochnom azote v krovi u ovets v norme. **[The alkali reserve and residual nitrogen in blood of normal sheep.]**—*Veterinariya, Moscow.* No. 4. pp. 133–134. **2430**

The average alkali reserve of normal sheep blood was 54–56 vol.%. A somewhat lowered value was found to be associated with transportation of the sheep, a monotonous diet, or the later stages of pregnancy and lactation. The average value for the blood residual nitrogen varied from 20–47 mg. %. One sheep gave an abnormally high value of 63 mg. %, which fact may have been due to its greater age (3 years).—L. L.

SPEELMAN, S. R., DAWSON, W. M., & PHILLIPS, R. W. (1944.) **Some aspects of fertility in horses raised under western range conditions.**—*J. Anim. Sci.* **3.** 233–241. [Authors' summary copied *verbatim*.] **2431**

Data are presented on certain aspects of fertility of 209 mares bred to 14 stallions over a 15-year period at the U.S. Range Livestock Experiment Station, Miles City, Montana, in a cooperative study with the Montana Agricultural Experiment Station.

The general fertility level was 59·6 percent (based on the number of mares bred) and 46·8 percent (based on the number of estrus periods in which the mares were bred). The effect of year was apparently not connected with any trend but there were indications that it was associated with the fertility of the particular stallions used in different years. Very young mares as well as old mares appeared to have a lower fertility than mares of intermediate ages.

The order of fertility of the mares of the different breed groups was Belgian, Morgan, grade-light and grade-draft. Differences in the stallions used and possibly management appeared to account for much of the difference. Significant differences were found between the fertility of stallions bred to the same mares in seven out of 15 comparisons.

One set of twins was obtained in 567 foalings. The sex ratio was 97·6 males per 100 females for all the foals (568). Eighty-seven and two-tenths percent of the foals born were weaned. The numbers dying of different causes are listed.

BROWN, P. C. (1944.) **Physiological and histological changes in the vagina of the cow during the estrual cycle.**—*Amer. J. vet. Res.* **5.** 99–112. **2432**

The cyclic changes occurring in the vagina were studied in a herd of 38 dairy cows. Examinations were carried out every five days throughout the oestrous cycle, 400 examinations being made altogether. The examination included inspection of the vagina for degree of vascularity, pH determinations *in vivo* with a special glass electrode, estimation of the degree of cervical tone by digital palpation, and collection of secretions and biopsy specimens. The ovaries and uterus were also palpated *per rectum*.

A total of 807 pH determinations were made. The values ranged from 8·3–6·2, and 86·4% lay between 6·5 and 7·5. Variations during the cycle were small but there was a tendency for the pH to fall at oestrus. Four cows required four or more services before conception, but no apparent correlation was found between failure to conceive and the pH of the vagina.

The development of hyperaemia of the vaginal mucosa was very marked 36–24 hours prior to oestrus; vascularity was most marked at oestrus, returning to normal 3–5 days afterwards.

Vaginal secretion was most abundant at oestrus; attempts were made to measure the surface tension of the secretions but the results are said to be "not entirely satisfactory". [For detailed description of physical properties of bovine cervical mucus, see BLAIR *et al.*—*V. B.* **12.** 508.]

Relaxation of the cervix was noted 6–4 days before onset of oestrus; it was maximal at oestrus and returned to normal 1–5 days afterwards.

Histological examination of the biopsy specimens gave results essentially similar to those of COLE [(1930.) *Amer. J. Anat.* **48.** 261.]

Follicles could not be palpated with certainty until 12 hours before onset of oestrus. Corpora lutea could be distinguished as early as the third day after oestrus; these reached maximum size 9–11 days after oestrus.

—ALFRED T. COWIE.

SYKES, J. F., & COLE, C. L. (1944.) **Modification of mating season in sheep by light treatment.**—*Quart. Bull. Mich. agric. Exp. Sta.* **26.** 250–252. **2433**

Eight ewes—four Rambouillet × Cotswold, two Rambouillet, one Southdown and one Hampshire—were submitted to an increase of light over the normal day during March by means of two 100-watt lights, followed by a gradual decrease in light exposure during April and May which at the end of the latter month amounted to a deficiency equivalent to six hours of daylight. During the period when the ewes were under close observation, five of the animals were served by the ram one or more times; the earliest breeding date observed occurred on April 16th. Four of the ewes were re-bred at oestrous periods subsequent to the first noted. Five of the eight ewes produced normal lambs, while a sixth possibly aborted. These lambings occurred 4–5 months earlier than the usual time and must have resulted from mating during early June. Experiments with larger numbers of ewes, including a better breed representation, are being undertaken to determine whether this technique will be generally applicable to all breeds of sheep.—N. J. SCORGIE.

KLINE, B. S. (1944.) **The Salmon, Geist, Salmon, Frank six hour rat test for pregnancy.**—*Amer. J. clin. Path.* **14.** 557–562. **2434**

The six-hour test for pregnancy diagnosis in the human being described by SALMON *et al.* (1942) has been found to be reliable. Slight modifications of technique are suggested. 432 tests were carried out on 401 urine samples and results were checked against clinical findings in 196 cases. Of 92 positive results, one was incorrect; of 91 negative results, 9 proved to be from pregnant women. These 9 samples, however, were from early pregnancies, 5–15 days after the last missed period. 13 tests gave doubtful results from which no diagnosis could be made.

[See also ZONDEK *et al.* (*V. B.* **15.** 305) for use of this test in mares.]—ALFRED T. COWIE.

CHASE, J. H. (1945.) **Serological and immunochemical studies on the gonadotrophic hormones.**—*Yale J. Biol. Med.* **17.** 517–538. [Author's summary copied *verbatim*.] **2435**

The following results substantiate the hypothesis that the reaction between the gonadotrophic hormone and its specific antihormone is a true immunological phenomenon: 1. A precipitin test, using gonadotrophic hormone-collodion particle complex as antigen and biologically active antiserum, has been developed. 2. The reaction of the hormonal antiserum to freezing and thawing is comparable to the reaction of immune sera. Also, the biologically active portion reacts in the same manner. 3. The titer of precipitating antibodies increases and decreases with the antihormonal titer. 4. The increase in precipitating antibodies and in biologically active antihormone is accompanied by an increase in gamma-globulin, as demonstrated in electrophoresis experiments. 5. Gamma-globulin, separated mechanically in the Tiselius apparatus, exhibits both in vitro and in vivo activity. Equivalent quantities of gamma-globulin have three times the activity of the whole serum.

LARDY, H. A., CASIDA, L. E., & PHILLIPS, P. H. (1944.) **The effect of various gonadotropic hormone preparations on the blood plasma ascorbic acid of sheep and rabbits.**—*Endocrinology.* **35.** 363–369. **2436**

Four anoestrous ewes injected subcutaneously with 400 I.U. of pregnant mare serum gonadotropin showed a decrease of blood plasma ascorbic acid (B.P.A.A.) within eight hours and the level remained low for 16 days. A further injection of 400 I.U. of gonadotropin on the 16th day produced a transient rise in B.P.A.A. on the following day.

400 I.U. of serum gonadotropin injected subcutaneously into each of three anoestrous and three pseudopregnant rabbits produced in 12 hours a marked fall in B.P.A.A. level. A follicle-stimulating extract from sheep pituitary reduced the B.P.A.A. level in ewes when administered on the 4th, 8th or 12th day of the oestrous cycle. The same extract, on the other hand, increased the B.P.A.A. level in a group of 11 oestrous rabbits but it did not affect significantly the B.P.A.A. level in one group of nine oestrous and in another group of nine pseudopregnant rabbits, these two latter groups having initially a low B.P.A.A. level. An unfractionated pituitary extract also depressed the B.P.A.A. level of ewes.

There is some evidence that the B.P.A.A. level of ewes varies with the stage of the oestrous cycle.

—ALFRED T. COWIE.

EVERETT, J. W. (1944.) **Evidence suggesting a rôle of the lactogenic hormone in the estrous cycle of the albino rat.**—*Endocrinology.* **35.** 507–520. **2437**

E. used prolactin (lactogen) with success under certain conditions to induce cyclic ovulation in "persistent-oestrous" rats. In the absence of previously formed luteal tissue it was ineffective. Evidence is reviewed which suggests that "persistent-oestrous" rats are relatively deficient in prolactin output and are thus deprived of its luteotropic action. The implications of this theory in elucidating the hormonal mechanisms of the oestrous cycle of the normal rat and the endocrine aberrations in the "persistent-oestrous" rat are discussed at some length.—ALFRED T. COWIE.

FINKELSTEIN, G., GORDON, A. S., & CHARIPPER, H. A. (1944.) **The effect of sex hormones on the anemia induced by hemorrhage in the rat.**—*Endocrinology.* **35.** 267–277. **2438**

When normal male and female rats were subjected to bleeding, the males showed a greater rate of red blood cell (R.B.C.) regeneration and probably also of haemoglobin formation than the females.

Daily injections of 1·25–2·50 mg. testosterone propionate, accelerated R.B.C. formation in the males and

20–200 R.U. oestradiol benzoate delayed R.B.C. formation in the females. In both sexes the respective hormone delayed Hb formation. Normal rats of both sexes which had been bled were treated with daily injections of 1·25 mg. testosterone propionate, or 2·50 mg. $Co(NO_3)_2.6H_2O$. Both substances were effective in accelerating R.B.C. regeneration; cobalt was more effective in the male, and in the female they were equally effective. In the male, cobalt had no effect on Hb regeneration and testosterone slightly inhibited it; in the female both slightly aided Hb formation. Hypophysectomized rats subjected to haemorrhage were able to regenerate R.B.C.'s and Hb. When given daily injections of 1·25 mg. testosterone propionate, marked acceleration of the regeneration rate of R.B.C.'s and Hb. was noted.

Regeneration of R.B.C.'s and Hb was more rapid in gonadectomized females which had been bled than in gonadectomized males which had been bled. 1·25 mg. testosterone propionate accelerated the regeneration of R.B.C.'s and Hb in the gonadectomized males but only of the R.B.C.'s in the gonadectomized females. 1·25 mg. cobalt speeded R.B.C. and Hb formation in gonadectomized rats of both sexes. A combination of testosterone and cobalt exhibited marked synergism and was most effective in speeding R.B.C. formation; its influence on Hb was similar to that of cobalt alone. Post-haemorrhagic reticulocyte behaviour was not altered by any of the treatments.

Histological examination of the bone marrow of the femurs indicated that the hormone affected the erythrogenic process itself. It is concluded that the sex hormones play a normal role in the process of erythrogenesis and that the male sex hormone aids in recovery from a post-haemorrhagic anaemia by virtue of its erythropoietic effect.—ALFRED T. COWIE.

FOLEY, G. E., & AYCOCK, W. L. (1944.) **The effect of stilbestrol on experimental streptococcal infection in mice.**—*Endocrinology*. **35.** 139–145. **2439**

A single injection of 400–500 I.U. of diethylstilboestrol rendered mice highly resistant to intraperitoneal injections of various types of mouse-virulent haemolytic streptococci. These injections produced a high mortality in control mice. No protection was afforded by the oil used as a vehicle for the oestrogen or by vitamin K. The protective action of the oestrogen lasted 8–10 days. Haemolytic streptococci were recovered from the heart blood and peritoneum of most of the control mice but only occasionally from the oestrogen-treated animals; this suggests that diethylstilboestrol may in some way interfere with the spread of haemolytic streptococci in mice.

The authors stress the importance of such factors as heredity, and the nutrition and endocrine function of the host rather than variation of the parasite in determining disease upon exposure to the infectious agent. —A. T. COWIE.

DEY, B. B., KRISHNAN, P. S., & GIRIRAJ, M. (1944.) **Glands and gland products. I. The endocrine glands of South Indian animals. IV. Seasonal variations in the total iodine and thyroxine contents of the thyroid glands of South Indian animals.**—*Current Sci.* **13.** 35–36 & 199–200. [Parts II & III of no veterinary interest.] **2440**

I. The authors give the characters and weights of certain endocrine glands of cattle, buffaloes, sheep and swine.

IV. The thyroid is susceptible to geographic and seasonal variation. In regions where goitre is endemic the iodine content is low. Some authors have tried to show that in oxen, sheep and swine the iodine content is high in summer, as a result of diet or temperature. If this were the case increased winter metabolism would tend to deplete the gland, so that glands taken during the winter would not be suitable for commercial use. The present authors, however, working with South Indian cattle, sheep and swine over a period of 12 months, dried and analysed thyroids for total and thyroxine I contents. From the figures shown, it is apparent there is practically no seasonal variation in these substances.—D. N. MULLICK.

SOFFER, L. J., COHN, C., LESNICK, G., SOBOTKA, H., & JACOBS, M. (1944.) **Effect of sodium iodide, magnesium sulfate, thyroxin, and thyrotropic hormone on the blood magnesium partition.**—*J. clin. Invest.* **23.** 263–266. **2441**

In an attempt to elucidate the factors involved in the elevation of the percentage of bound magnesium in Graves' disease, the effects were studied of the administration of sodium iodide, magnesium sulphate, thyroxine, and thyrotropic hormone on the blood magnesium partition in normal dogs. Sodium iodide, magnesium sulphate and thyroxine produced no appreciable change, whereas the thyrotropic hormone produced an initial increase in the percentage of bound magnesium followed by a fall to considerably below control values. The significance of these findings in relation to the clinical condition is discussed.—ALFRED T. COWIE.

See also absts. **2309** (blood picture in Johne's disease), **2415** (diet and ovarian function).

POISONS AND POISONING

KEHAR, N. D., & RAU, K. G. (1944.) ***Nerium odorum* (oleander) poisoning in livestock.**—*Indian J. vet. Sci.* **14.** 25–26. **2442**

Nerium oleander is grown extensively in India as an ornamental garden plant. The leaves were lethal when fed to hill bulls, goats and sheep at the rate of 4·0, 1·2 and 0·3 g. respectively per kg. body weight. —S. K. T.

KEHAR, N. D., & RAU, K. G. (1944.) **Poisoning of livestock by *Datura stramonium* L.**—*Indian J. vet. Sci.* **14.** 112. **2443**

Feeding experiments were carried out on farm animals to determine toxicity of a hill and a plains variety of *D. stramonium*. The plains variety caused mild symptoms, while the hill variety caused no typical toxic symptoms under the amounts administered.—A. K. PAL.

CLARE, N. T. (1944.) **Photosensitivity diseases in New Zealand. III. The photosensitizing agent in facial eczema.**—*N.Z. J. Sci. Tech.* Sect. A. **25.** 202–220. [For Parts I and II, see *V. B.* **14.** 247–248.] **2444**

Details are given of the examination of blood and urine from cases of sheep and cattle with "facial eczema". Phylloerythrin and coproporphyrin I were isolated and identified by melting point determinations, and other pigments probably derived from chlorophyll were found in the urine. The amount of phylloerythrin in the blood was shown, by comparison with injection experiments, to be sufficient to account for the symptoms of photosensitivity. Similar experiments with coproporphyrin I indicated that it does not play any part in the photosensitization. Sheep in the early "drooping ears" stage of "facial eczema", and normal sheep which had been injected with phylloerythrin were shorn and the bare skin was exposed to sunlight under various

filters. In both cases lesions were produced, the skin being sensitive to light of wavelengths 400–620 mμ.

The conclusion is drawn that phylloerythrin is the photosensitizing agent in "facial eczema". The presence of phylloerythrin in the peripheral blood is a consequence of the liver dysfunction which is a characteristic of the disease.—M. B. BUDDLE.

BETTY, R. C., & TRIKOJUS, V. M. (1943.) **Hypericin and a non-fluorescent photosensitive pigment from St. John's wort** (*Hypericum perforatum*).—*Aust. J. exp. Biol. med. Sci.* **21.** 175–182. [Authors' summary copied *verbatim.*] **2445**

By carrying out all processes in the dark or in subdued artificial light, *Hypericum perforatum* has been shown to yield a non-fluorescent pigment (which rapidly becomes fluorescent when solutions of it are exposed to daylight) and a fluorescent pigment (hypericin (D)), which were easily separated by adsorption methods. By extraction in daylight, a red-fluorescent pigment (hypericin (L)) only was obtained.

When tested on rats, the red-fluorescent pigment (hypericin (D)) proved to be more potent, and showed some differentiation in its action, compared with the non-fluorescent pigment, both before and after its transformation by light.

ROCHA E SILVA, M. (1943.) Estudos sobre a dicoumarina—3,3′-metileno*bis*-(4-hidroxicoumarina). I. Historico e experiencias preliminares. [**Studies on dicoumarin. I. Review and preliminary experiments.**]—*Arq. Inst. biol., S. Paulo.* **14.** 293–309. [English summary.] **2446**

The author reviews previous work describing sweet clover disease in cattle. The agent causing delay in blood clotting following wounds or operation was identified as dicoumarin; the laboratory synthesis of this compound is described. Biological assay of the substance was carried out on rats and rabbits and curves show that dicoumarin given intravenously or *per os*, increases the prothrombin time after a latent period of 1–2 days. In one rabbit the prothrombin time was prolonged to over 1,800 seconds, as compared with a normal value of about 10 seconds, and the animal died. General symptoms in experimental animals included abdominal and cutaneous haemorrhages coinciding with severe anaemia and slight liver damage.—K. J. SINCLAIR.

PIERCY, P. L., HARGIS, G., & BROWN, C. A. (1944.) **Mushroom poisoning in cattle.**—*J. Amer. vet. med. Ass.* **105.** 206–208. **2447**

Illness in cattle on range pasture in the Louisiana Piney Woods region during late September and early October, 1943, is attributed by the authors to the ingestion of gilled fungi which were especially prevalent after heavy rains, following an extremely dry and warm summer. In addition to other fungi, an unusually large number of specimens of the "destroying angel", *Amanita verna*, were present.

There was painful defaecation with matted faeces around the base of the tail and ischia. On examination there was found severe irritation with numerous vesicles and necrotic areas on the anus. The rectal mucosa was ulcerated and in some instances rectal prolapse had occurred. The faecal material was usually normal in consistency, but a few animals had slight diarrhoea. There was marked loss of weight but no anorexia; appetite and rumination were normal until just before death. In fatal cases the animal died in convulsions.

On P.M. examination, marked inflammation was found throughout the digestive tract; the liver and heart were mottled with haemorrhagic areas, the kidneys were rather pale in colour and the bladder was distended with urine. Animals in affected herds appeared to relish the fungi and to prefer them to other range plants available.

A rabbit and a calf would not take *Amanita verna* and to test toxicity it was necessary to resort to forced feeding. The rabbit died two days after receiving one small mushroom with a P.M. picture of tissue changes similar to those found in the cattle. The calf, which received a total of 216 g. of fungi, showed no abnormalities.

There is no evidence in the article that the affected cattle had actually eaten any of the fungi, beyond the general statement that the cattle grazing on the pastures relished them.—H. PAVER.

SARKISOV, A. K., & ORSHANSKAYA, V. N. (1944.) Laboratornaya diagnostika toksicheskovo shtamma griba Stachybotrys alternans. [**Laboratory diagnosis of the toxic strain of** *Stachybotrys alternans.*]—*Veterinariya, Moscow.* No. 2–3. pp. 38–40. **2448**

Horses become ill when given coarse fodder, principally straw, infected with a toxic form of the fungus *Strachybotrys alternans.* The examination of fodder for this fungus is described and illustrations are given of the appearance of the fungus on straw, in cultures and in the organs of affected horses.—E. W. L.

BLOUNT, W. P. (1944.) **Chemical warfare and farm animals.**—*Vet. J.* **100.** 249–257. **2449**

This article is the substance of a lecture delivered to the personnel of the Farm Emergency Livestock Service and is written in terms readily understandable by lay persons. B. states concisely the salient points to be observed in combating the effects which might be produced by chemical agents used in warfare. There is, however, little in the article which has not been dealt with in various articles already abstracted in the *Vet. Bull.*—H. E. BYWATER.

See also absts. **2402** (*Matricaria nigellaefolia* intoxication in cattle), **2403** (mouldy maize poisoning in horses).

PHARMACOLOGY, THERAPEUTICS AND DISINFECTION

KUSTRYA, B. D. (1940.) Prodolzhitel'nost' prebyvaniya i kharakter raspredeleniya tripoflavina v organizme zhivotnykh posle evo vnutrivennovo vlivaniya. [**Mode of dispersion of trypaflavine after intravenous injection.**]—*Veterinariya, Moscow.* No. 5. pp. 60–66. [French summary.] **2450**

Trypaflavine was injected intravenously into white rats and bovines. After urine analyses, the animals were killed, and the trypaflavine in the various organs was estimated at periods of one hour to 20 days after injection. The following conclusions were reached.

The blood trypaflavine drops in the first 10 min. from 4–5 mg. % to 0·2–0·3 mg. % as a result of its being taken up by various tissues. The last traces (0·01–0·03 mg. %) may, however, persist for 4–5 days in the blood and up to 20 days in other tissues.

The kidneys take up the most trypaflavine, followed by the heart (in rats only), the liver, the spleen, the wall of the gastro-intestinal tract, fat depots, and the brain. The trypaflavine was estimated photometrically by a fluorescent method.

Increasing the injected dose increases both tissue uptake and tissue retention. Injecting doses of 0·005–0·007 g. per kg. body weight into cattle at 8-day inter-

vals does not cause the trypaflavine to accumulate. Excretion by the kidneys reaches a maximum in 1–5 hours, but traces may occur in the urine for up to 11 days.—L. LEVENBOOK.

SEELER, A. O., MUSHETT, C. W., GRAESSLE, O., & SILBER, R. H. (1944.) **Pharmacological studies on sulfaquinoxaline.**—*J. Pharmacol.* **82.** 357–363. **2451**

When tested against the avian malaria parasite, *Plasmodium lophurae*, on a weight basis, 2-sulphaquinoxaline is twice as effective as sulphadiazine or sulphapyrazine. It is remarkable in that it remains in the blood for several days after dosing and produces a hypoprothombinaemia within 24 hours of dosing, which, however, can be prevented by the administration of vitamin K. The drug is converted into a hydroxy derivative which may cause kidney damage in rats and monkeys but not in dogs or rabbits.—E. B.

NECHINENNYÏ, D. K. (1940.) Vsasyvanie, nakoplenie i vydelenie mysh'yaka iz organizma posle vvedeniya osarsola. [**Absorption, accumulation and elimination of arsenic after injection of osarsol (stovarsol).**]—*Veterinariya, Moscow.* No. 5. pp. 117–124. [French summary.] **2452**

Osarsol was fed to and injected into rabbits, dogs and pigs. The arsenic fraction was used as a tracer and as a result of detailed analyses, the following conclusions were reached.

The absorption and distribution of As in the body bear no quantitative relationship to the amounts injected. The condition of the subject appears to be the deciding factor.

Even when given in an insoluble form, As is absorbed both in the stomach and the small intestine, but more As appears to be taken up by the body organs when injected intravenously, than when the same dose is given *per os*. Quantitatively, As is taken up by the tissues in the decreasing order of liver, kidneys, lungs, skin, spleen and muscle.

For a period up to 70 days, As continues to be excreted in the faeces and urine; about twice as much is excreted in the faeces as in the urine. The quantity eliminated does not decrease gradually, but varies. For a period of over five months, long after it has become undetectable in the faeces, As may still be found in the tissues. Large amounts of As reach the alimentary canal from the rest of the body *via* the bile; much smaller quantities are present in the saliva and gastric and intestinal juices.—L. LEVENBOOK.

SEEGAL, B. C., & HOLDEN, M. (1945.) **The antibiotic activity of extracts of Ranunculaceae.**—*Science.* **101.** 413–414. **2453**

Pressed juice of the buttercup (Ranunculaceae family) or steam-distillate from it is a strong antibiotic, but unfortunately rather toxic for animals. It is effective *in vitro* in inhibiting the growth of several Gram-positive and Gram-negative pathogenic cocci and bacilli, *Mycobacterium tuberculosis*, and three yeasts, *Candida* (*Monilia*) *albicans*, *Candida* (*Monilia*) *krusei*, and *Cryptococcus hominis*, all of which are potential human pathogens. Attempts are being made to separate the toxic from the antibiotic substance by chemical methods.
—A. B. PATERSON.

DAWSON, M. H., HOBBY, G. L., MEYER, K., & CHAFFEE, E. (1943.) **Penicillin as a chemotherapeutic agent.**—*Ann. intern. Med.* **19.** 707–717. **2454**

Penicillin is rapidly excreted by the kidney, being completely removed from the blood 2–4 hours after an intravenous or intramuscular injection.—E. BOYLAND.

ANSLOW, W. K., RAISTRICK, H., & SMITH, G. (1943.) **Anti-fungal substances from moulds. Part I. Patulin (anhydro - 3 - hydroxymethylene tetrahydro - 1 : 4 - pyrone-2-carboxylic acid), a metabolic product of Penicillium patulum Bainiér and Penicillium expansum (Link) Thom.**—*J. Soc. chem. Indust., Lond.* **62.** 236–238. **2455**

Patulin has now been isolated from the apple-rot organism, *P. expansum*. In high dilution it completely inhibits the growth of species of *Pythium*, which cause damping off of seedlings. [Patulin has since been shown to be very toxic to animal tissues.]—E. BOYLAND.

BRUECKNER, A. H. (1943.) **Sulfonamide activity as influenced by variation in pH of culture media.**—*Yale J. Biol. Med.* **15.** 813–821. **2456**

The activity was determined of sulphanilamide, sulphaguanidine, sulphapyridine, sulphathiazole and sulphadiazine against *Staphylococcus aureus* grown *in vitro* in a synthetic medium at pH 6·5–8·9. The results do not substantiate the hypothesis that the activity of the individual sulphonamide increases as the ionized fraction increases. This does not, however, prove that the ion is not the most active fraction of the sulphonamides, but indicates only that the molecular fraction of a sulphonamide solution may play an important part in determining the intracellular concentrations of the active fraction, and that the influence of pH must have a more complex basis than a single change in the concentration of sulphonamide ions in culture media.
—J. M. ROBSON.

DOMUZASHVILI, V. I. (1943.) Streptotsidoterapiya streptokokkovykh zabolevaniĭ loshadeĭ. [**Sulphonamide therapy of streptococcal infections of horses.**]—*Veterinariya, Moscow.* No. 1. pp. 21–22. **2457**

D. describes experiments to discover the preventive effect of sulphonamides on the development of complications in strangles, broncho-pneumonia, etc. and their effect on fever and general clinical conditions, and to establish a minimum therapeutic dose.

Strangles, including complicated and atypical forms, infectious catarrh of the upper respiratory tract, broncho-pneumonia and other streptococcal infections were treated over a period of four years with varying doses of white and red "streptotsid" [sulphanilamide and prontosil rubrum respectively ?].

No noticeable improvement was observed when strangles was treated with doses of 2·5 g. per kg. administered twice daily. With doses amounting to 10·0 and 15·0 g. administered for 6–10 days the temperature fell to normal on the 3rd to the 5th day. The sulphonamides had no preventive effect on the development of complications. They were most efficacious in the treatment of infectious catarrh of the upper respiratory tract and its complications, *e.g.* bronchitis, the temperature falling to normal on the 2nd or 3rd day.

The minimum curative dose was found to be a total of 10·0 g. of red and 15·0 g. of white "streptotsid", per kg. body weight, given two or three times daily. Red "streptotsid" is taken most unwillingly in drink or fodder and is often refused altogether; no such difficulty is experienced when white "streptotsid" is used.
—E. CHERKESI.

MILLER, D. K., & REKATE, A. C. (1944.) **Inhibition of growth of Mycobacterium tuberculosis by a mold.**—*Science.* **100.** 172–173. **2458**

A mould, which probably belongs to the penicillium group, was mixed with a suspension of tubercle bacilli and left at room temperature for 24–48 hours. Cultures from the suspensions showed growth in only one case out of 13, although acid-fast bacilli were still present in smears after several months' incubation. Six of 13 g. pigs injected with the suspension died of TB., while

the remaining seven remained negative to the tuberculin test. The mould was grown at room temperature on cultures of tubercle bacilli, suspensions were prepared, cultures and smears made, and g. pig injections carried out. All cultures proved negative and no g. pig died of TB., all tuberculin tests being negative. The mould grew well on high (1 : 10,000) dilutions of tuberculin and in saline solutions of 0·0002 mg. of P.P.D. per ml., but inactivated both. Suspensions of the mould and supernatant fluid from the mould growth inactivated 1 : 100 tuberculin in two hours at room temperature or at 37°C. The culture medium passed through an E.K. Seitz filter gave a filtrate which did not inactivate tuberculin. The antibacterial substance produced is not believed to be similar to penicillin since the supernatant liquid from mould growth did not inhibit growth of *Staphylococcus aureus*.—A. B. PATERSON.

HODGSON, G. A. (1945.) **Two cases of erysipeloid [*Erysipelothrix rhusiopathiae* infection] treated by penicillin.**—*Brit. med. J.* April 7th. 483. **2459**

Two army cooks while cutting up a carcass of fresh veal became infected through small abrasions on the fingers. The clinical symptoms which started to develop on the following day are described.

Treatment with sodium penicillin was started on the eighth day of the illness. Doses of 15,000 units at three-hourly intervals were given until a total of 485,000 units in one case and 560,000 in the other had been used. In each case amelioration occurred after 24 hours and cure was almost complete by the third day. By the fifth day all that remained was slight discoloration of the skin of the affected area and some desquamation around the original point of infection.—M. C.

VOLOSKOVA, A. P. (1940.) Profilakticheskie svoïstva atropina i khloristovo ammoniya pri abortakh, vyzyvaemykh Bac. paratyphus abortus equi u krolikov. **[Prophylactic power of atropine and ammonium chloride in *Salmonella abortus-equi* infection in rabbits.]**—*Veterinariya, Moscow.* No. 5. pp. 125–128. [French summary.] **2460**

Salmonella abortus-equi was injected subcutaneously into spayed mice and vaginal smears were made twice daily for 10–11 days. A dose of 0·001 ml., containing $1·2–2 \times 10^8$ organisms per ml. gave the typical oestrogenic reaction in 48–96 hours. Subcutaneous injections into pregnant rabbits of 0·02 g. atropine sulphate on the 15th, and 0·002 ml. *S. abortus-equi* on the 21st-23rd day of pregnancy resulted in 64·5% of normal litters, whereas in controls receiving no atropine, there were only 10·5%. [This latter appears to be an unusually low figure.] Feeding ammonium chloride to salmonella-infected rabbits did not significantly decrease the number of abortions as compared with controls to which no NH_4Cl was fed.—L. LEVENBOOK.

SCHÜRMANN, E. (1944.) "Avomin"—ein negatives Therapeutikum für die Bekämpfung der Hühnerkokzidiose. **[Treatment of fowl coccidiosis with "avomin". (Preliminary article.)]**—*Berl. Münch. tierärztl. Wsch./Wien. tierärztl. Mschr.* April. 14th. 126–128. **2461**

S. concludes that "avomin" is not a suitable therapeutic agent for the treatment of coccidiosis. It is pointed out that the passing of oocysts in the faeces takes place irregularly at intervals of 1–7 days and that the absence of oocysts from the faeces does not necessarily preclude the presence of coccidia. There is a note of warning that the merits of a therapeutic agent cannot be rightly assessed if the chickens are maintained under such conditions of hygiene that the disease would disappear in any case.—C. HORTON SMITH.

OLSEN, O. W., & ALLEN, R. W. (1945.) **Tests with carbon tetrachloride, hexachlorethane, and tetrachlorethylene, for removing the fringed tapeworm of sheep.**—*Proc. helminth. Soc. Wash.* **12**, 2. **2462**

Fifty sheep were each given 1·0 ml. carbon tetrachloride in a gelatin capsule, 50 were given 25 ml. tetrachlorethylene in a gelatin capsule which was placed in a larger gelatin capsule containing 2·5 g. magnesium sulphate, and 75 sheep were given as a drench 30 ml. of hexachlorethane-bentonite-water suspension containing 15 g. hexachlorethane; 456 sheep served as controls. The sheep were slaughtered three days after treatment and examination of the livers and intestines of the several groups of sheep showed no significant difference in the incidence of *Thysanosoma* between the treated and control groups.—T. E. GIBSON.

UNDERWOOD, P. C. (1945.) **Some chemotherapeutic tests in canine filariasis (*Dirofilaria immitis*).**—*Proc. helminth. Soc. Wash.* **12**, 4–6. **2463**

Tryparsamide, acetarsone, sodium cacodylate, neostibosan, antimony thioglycollamide, antimony sodium thioglycollate, ammonium antimony tartrate, bismosol, bismocymol, bismuth sodium tartrate, ichthargan, and emetine hydrochloride were tested against *D. immitis* in 14 dogs. No significant action against either the adult worms or the microfilariae was shown by any of the drugs employed, but tryparsamide produced a tonic action, the treated dogs gaining weight considerably after treatment. Ammonium antimony tartrate and ichthargan proved to be highly toxic.
—T. E. GIBSON.

GUTHRIE, J. E., & HARWOOD, P. D. (1944.) **Limited tests of mixtures of tin oleate with ammonium compounds for the removal of experimental tapeworm infections of chickens.**—*Proc. helminth. Soc. Wash.* **11**. 45–48. **2464**

Earlier investigations by these authors and others, [see *V. B.* **11**. 642 & 801] had indicated that mixtures of synthetic pelletierine hydrochloride with various tin salts exercised a synergistic action in the removal of experimental infestations of *Raillietina cesticillus* from chickens. Tests with cheaper ammonium compounds were carried out because synthetic pelletierine hydrochloride could not be used economically in the field.

Mixtures of tin oleate with triethanolamine and with ammonium hydroxide were used on chickens experimentally infected with *R. cesticillus* and on others with *Hymenolepis carioca*.

Tin oleate and triethanolamine when freshly prepared gave good results against *R. cesticillus* and were also effective against *H. carioca*; the mixture deteriorated, however, within a few days of its preparation. The ammonium hydroxide and tin oleate mixture was satisfactory against *H. carioca* but not against *R. cesticillus*.

Further investigations along these lines were considered desirable.—J. D. BLAXLAND.

HARWOOD, P. D., & STUNZ, D. I. (1945.) **Phenothiazine and nicotine-bentonite as an anthelmintic in turkeys.**—*Proc. helminth. Soc. Wash.* **12**. 1–2. **2465**

In two experiments involving six turkeys in each, the authors fed phenothiazine and nicotine-bentonite together in the mash to turkeys naturally infected with *Ascaridia dissimilis* and *Heterakis gallinae*. Efficacy of the treatment was determined by comparing the number of worms recovered from the faeces with the number found at P.M. examination four days later.

The anthelminthic mixture removed 69·6% and 42·9% respectively of the *Ascaridia* and 95·9% and 99·7% respectively of the *Heterakis* in the two experiments.—J. D. BLAXLAND.

STEWART, M. A. (1945.) **Phenothiazine in veterinary practice.**—*J. Amer. vet. med. Ass.* **106.** 217–222. **2466**

S. summarizes the use of phenothiazine in veterinary practice. He deals with its use as a prophylactic and as a therapeutic agent and also discusses contra-indications. One section of the paper treats fully of the specific anthelmintic action of phenothiazine. The article is essentially a review and contains no new information.—T. E. GIBSON.

BHALERAO, G. D. (1944.) **Chemotherapy of helminthic infections of domestic animals.**—*Indian J. vet. Sci.* **14.** 125–131. **2467**

B. gives information regarding anthelmintics found during the last 15 years to be efficacious in domestic animals, but omits references to proprietary preparations of unknown composition and to drugs which have only been tried *in vitro*. Doses of drugs known to be effective, their contra-indications, toxicity and mode of administration are mentioned for the following infestations :– distomatosis due to *Fasciola* spp. and *Dicrocoelium lanceolatum*, nasal schistosomiasis, gastro-intestinal helminths, lungworms and tapeworms in ruminants ; strongylosis, habronemiasis, ascariasis and oxyuriasis in horses ; ancylostomiasis, ascariasis, taeniasis, dracontiasis, and infestations with *Paragonimus* spp. and *Dirofilaria immitis* in dogs, and infestations by *Ascaridia*, *Heterakis*, *Capillaria*, gape-worms and tapeworms in poultry. Treatments for some forms of cutaneous helminthiasis are also given. Some advances in anthelmintic medication, *e.g.*, the addition of charcoal to santonin, oil of chenopodium or carbon tetrachloride to reduce their toxicity, the automatic drenching gun for ruminants, and some tests for evaluating the efficacy of anthelmintics are referred to briefly. Reference is also made to what HAGENA (1936) considered an ideal anthelmintic, said to be efficacious against all species of worms and of low toxicity ; it contained paracymene, thymol, castor oil and kamala.—H. D. SRIVASTAVA.

LEUCHTENBERGER, R., LEUCHTENBERGER, C., LASZLO, D., & LEWISOHN, R. (1945.) **The influence of " folic acid " on spontaneous breast cancers in mice.**—*Science.* **101.** 46. **2468**

One of two groups of mice with spontaneous breast cancers was treated by daily intravenous injections of 5 μg. *Lactobacillus casei* factor (" folic acid ") the other acting as controls. Of 89 mice so treated, complete regression of the tumours was obtained in 38 animals as compared with none in the control group. Treated animals lived longer than the controls and the incidence of new tumours in the treated group decreased as compared with that in the controls.—A. EDEN.

KERGEL, G. (1944.) Zur Anwendung der intrauterinen Marfanil-Prontalbin-Infusion bei der Retentio secundinarum des Rindes. [**Treatment of retained placenta in cows by intrauterine infusion with " marfanil-prontalbin ".**]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* March 31st. 105–107. **2469**

In 59 cows with retained placenta and in which the general condition was good, the placenta was removed by hand and no drugs were given ; 93·2% [55] of the animals recovered completely. In 16 cows the general condition was not good and a marfanil-prontalbin solution was infused into the uterus after removal of the placenta ; 75% [12] of these animals recovered and the drug treatment appeared to produce a beneficial effect, though there was no control group.—J. M. R.

STRAUB, W. (1944.) Behandlung der Phosphorbrandwunden. [**Treatment of phosphorus burns.**]—*Berl. Münch. tierärztl. Wschr./Wien. tierärztl. Mschr.* March 31st. 114–115. **2470**

Unless all the phosphorus is removed from the wound, healing is prevented and toxic effects may be produced from its absorption. Mechanical removal cannot be relied upon ; the wound should be disturbed as little as possible and treated with a 2–5% solution of copper sulphate : this treatment detoxifies the phosphorus. A black appearance of the wound indicates that the treatment has been effective.—J. M. ROBSON.

ELFORD, W. J., & VAN DEN ENDE, J. (1945.) **Studies on the disinfecting action of hypochlorous acid gas and sprayed solution of hypochlorite against bacterial aerosols.**—*J. Hyg., Camb.* **44.** 1–14. **2471**

These studies were carried out to test the merits of hypochlorous acid gas and solutions of sodium hypochlorite as aerial disinfectants. The test organisms were *Streptococcus salivarius*, *Str. haemolyticus* group C and *Staphylococcus epidermidis*. The organisms suspended in water, broth, etc., were sprayed in aerosol form into glass-lined tanks or into a small experimental room. The fluctuation in bacterial content of the air was determined by suitable sampling apparatus. The disinfectants, also in aerosol form, were introduced after a preliminary control run with a bacterial suspension only.

The main points which emerged from the investigation were the following :– (1) Humidity played a dominant role in the bactericidal action of both hypochlorous acid gas and of hypochlorite aerosols. With relative humidities of 50% and less, the killing effect was slight, but there was a sharp rise in the 50–70% range, whilst at 70–90% practically all of the organisms were destroyed. (2) The efficacy of hypochlorite aerosols was much enhanced in the presence of 1% CO_2, but a satisfactory reduction in the bacterial population occurred when the concentration was equivalent to that of ordinary air (0·03–0·04%). It is inferred that hypochlorite mists owe their efficiency to hypochlorous acid gas liberated through interaction with CO_2. (3) The persistence of a bactericidal effect under maximum conditions of humidity is very poor when compared with other aerosol disinfectants, *e.g.*, hexyl resorcinol. In consequence, continuous spraying would be necessary to achieve permanent sterilization of the air. Nevertheless, it is estimated that, in practice, all the organisms (100,000 bacteria-carrying particles) emitted during sneezing would be destroyed in 3–4 min. by a concentration of 2·1 ml. sodium hypochlorite per 1,000 cu. ft. of air (0·22 p.p.m. hypochlorous acid gas). (4) Organisms unprotected by serum, etc., were susceptible to concentrations in air as low as 1 : 20,000,000, but a coating with organic matter materially increased their resistance. The mists were also relatively ineffective against dust-borne bacteria.—R. E. GLOVER.

See also absts. **2324**, **2326** (sulphonamide action), **2393** (treatment of canine babesiasis and rickettsiasis).

HYGIENE, PUBLIC HEALTH AND VETERINARY SERVICES

KOLOBOLOTSKIĬ, G. V. (1940.) Opredelenie nachal'nykh stadiĭ gnieniya myasa formol'nym potentsiometricheskim titrovaniem. [**Definition of the initial stages of putrefaction of meat by potentiometric formol titration.**]—*Veterinariya, Moscow.* No. 5. pp. 94–99. [French summary.] **2472**

K. considers that the best criterion for determining the initial stages of putrefaction of meat is the sum total of amino-acid and ammonia nitrogen, for the estimation of which he has devised a potentiometric formol method occupying only 30–40 min. The method and apparatus are described in detail and experiments are quoted

which clearly show the nitrogen increase incident on putrefaction.—L. LEVENBOOK.

GREAT BRITAIN. (1945.) **Report of the Committee on Veterinary Practice by Unregistered Persons.** pp. 15. London: H.M. Stat. Off. 8vo. 3d. **2473**

The chief recommendations of the Committee may be summarized as follows. The practice of veterinary surgery by unregistered persons should be prohibited under penalty, but this prohibition should not apply to the treatment of an animal by its owner, the rendering of first aid in an emergency, the destruction of an animal by painless means, and the performance of the following operations: castration, spaying of pigs under three months old, tailing of lambs, docking of the tail and the removal of the dew-claws of dogs before the opening of the eyes, and caponizing. It is proposed that unregistered persons of good character and not less than 28 years old who for seven of the previous ten years have been engaged in the treatment of animals as the principal means of livelihood should be entitled to registration on the register of "Existing Practitioners". Persons registered as "Existing Practitioners" should be subject to the jurisdiction of the R.C.V.S., have the right to sue for fees and have the same facilities as veterinary surgeons for obtaining necessary drugs. They should be permitted to use the title of "Registered Animal Practitioner". Since lay assistants can usefully be employed on tasks of a routine character it is proposed that provision should be made whereby the Minister of Agriculture and Fisheries and the Secretary of State for Scotland may, after consultation with the R.C.V.S., declare by Order, that specified duties performed by unregistered persons under the direction of a veterinary surgeon shall not be subject to the prohibition of veterinary practice by unregistered persons. It is recommended that the Minister of Agriculture and Fisheries and the Secretary of State for Scotland should be empowered to control the advertisement and sale of veterinary medicines.—T. E. GIBSON.

See also absts. **2300-2303**, **2306** (TB. control), **2312**, **2459** (swine erysipelas in man), **2344** (rabies control), **2386** (echinococcosis in Turkey), **2392** (trichinosis), **2419** (vitamin C in milk).

TECHNIQUE AND APPARATUS

HARRIS, L. E. (1944.) **Practical diagnostic tests for veterinarians.**—*J. Amer. vet. med. Ass.* **105.** 88–91. **2474**

H. describes routine diagnostic tests claimed to be of assistance to practitioners. Tests for cyanide are made by suspending cyanide test strips over suspected material in an airtight jar, the colour change being observed. For haemoglobin estimation the Tallquist method is described. H. detects abnormal milk samples by the bromthymol-blue method used either as a solution or by means of test cards, and by means of the Hotis test. A Home Office licence would be required in Great Britain to carry out the pregnancy tests described. Probably the most useful test included is the usual sodium nitroprusside method for acetone.—D. W. M.

LITTLE, P. A., & SUBBAROW, Y. (1945.) **Use of refined serum albumin as a nutrient for T. pallidum.**—*J. Immunol.* **50.** 213–219. [Authors' summary copied *verbatim.*] **2475**

Refined serum albumin has been identified as the important nutrient that has previously made animal fluids indispensable in the cultivation of *Treponema pallidum.* By using liver preparations together with serum albumin, we were able to maintain the spirochete continuously on serum-free media. *T. pallidum* could be cultivated for a limited number of transfers in media containing choline chloride, niacin, pantothenate, pyridoxine, riboflavin, thiamin, and ascorbic acid as a substitute for liver.

MELLO, M. J., & CUOCOLO, R. (1943.) Técnica para o xenodiagnóstico da habronemose gástrica dos equídeos. **[Technique for xenodiagnosis of gastric *Habronema* infestation of horses.]**—*Arq. Inst. biol., S. Paulo.* **14.** 217–226. [English summary.] **2476**

Following a brief review of work on *Habronema* spp. in the house fly, *Musca domestica,* the authors describe the following diagnostic technique. A suspension of suspect horse faeces plus about 20 clean eggs of the house fly are placed in a small tin lined with paraffin wax. The suspension occupying two-thirds of the tin is covered by a disc of filter paper which supports a layer of moistened cotton wool. A wire-mesh funnel-shaped cover is inverted over the tin and leads through a glass tube, held in a cork, into an inverted test-tube. Adult flies emerge in 7–8 days at 37°–39°C. and collect in the inverted tube. This is removed and plugged with cotton wool previously soaked in ether. The flies are dissected under a low-power microscope for the detection of *Habronema* larvae.—K. J. SINCLAIR.

See also absts. **2308** (election microscopy), **2322** (thionine blue staining of *Br. abortus* strain 19), **2346**, **2347** (purification of rabies virus), **2360** (of swine fever virus), **2372** (staining rickettsia), **2379** (medium for *Corynebact. ovis* toxin), **2382** (detection of pyrogens), **2434** (pregnancy diagnosis), **2472** (definition of initial stages of meat putrefaction).

REPORTS

GREAT BRITAIN. (1944.) **Annual report of the Royal Veterinary College and Hospital for the academic year ended the 30th September 1944.** pp. 4. Typescript. **2477**

The report gives information on examination successes, finance, and staff changes during the year 1943–44 and lists the research work carried out during that period. In the College, work has been carried out on the following subjects: luxation of the crystalline lens in the dog, bovine sterility, the effect of the implantation of synthetic oestrogens in the non-lactating ovariectomized cow, the nervous system of the ox, the reproductive process in the cat, the effect of parasitic infestation on nutrition in the rabbit, and the properties of ricin and other phytotoxins.

Research on the following subjects was carried out in the Research Institute of Animal Pathology: *Corynebacterium pyogenes* infection in cattle, the identification of *Corynebact. renale,* Johne's disease in cattle and goats, the normal flora of the respiratory tract of sheep and cattle, the occurrence of salmonella organisms in the mesenteric lymph nodes of the pig, calf pneumonia, the life cycle of *Babesia bovis* in the tick, a survey of coccidia in war dogs, and phenothiazine medication in goats.
—T. E. GIBSON.

GREAT BRITAIN. **Report of the Stock Health and Pasture Improvement Association (North-East of Scotland). Seasons 1940-1942.** pp. 34. Aberdeen: The Association. 8vo. **2478**

This report is concerned with management of hill grazings, the ectoparasites of hill stock, the chemical control of pests, and losses in hill stock. Lack of adequate heather burning, together with low prices during the years previous to 1939 are suggested as being the main reasons for the unsatisfactory conditions prevailing among hill stock.—G. B. S. HEATH.

GREAT BRITAIN. (1944.) **London School of Hygiene and Tropical Medicine (University of London) incorporating the Ross Institute. Report on the work of the school for the year 1943-44.** pp. 44. London: The School. 8vo. **2479**

The report summarizes the activities of the school during the year 1943–44 and deals briefly with the research work which has been carried out during the year. Lists are given of the papers published by members of the staff during the year and of donations and subscriptions received. Most of the work carried out at the School was of such a character as not to be of direct interest to veterinarians, but that of the Agricultural Research Council's Unit of Insect Physiology is of particular interest: work has been carried out on the permeability of the insect cuticle, the mode of action of insecticides used as dips against the sheep tick *Ixodes ricinus*, D.D.T. as a sheep dip, the water reactions of the sheep tick and the physiology of the sheep blowfly, *Lucilia sericata*. Work carried out in other departments on D.D.T., penicillin and diplococcin is of comparative interest to the veterinary research worker.—T. E. G.

Extracts from annual reports of Agricultural Experiment Stations, U.S.A. [The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published, abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports and of relevant papers contained in them will be found in the *Index Veterinarius*.] **2480**

ARIZONA, 1942–43.—A 75% reduction in WARBLE FLY INFESTATION in cattle was achieved by the application by power spray of a mixture of 10 lb. derris root (5% rotenone) with 100 lb. fine sulphur in 1,000 gal. water. Lice were also successfully eliminated.

COLORADO, 1942–43.—LISTERIASIS was diagnosed in two sheep flocks and caused 12% and 18% mortality respectively. Lambs dead of ENTEROTOXAEMIA were found to have an increase in blood sugar and in "cell volume". *Clostridium welchii* toxoid was incapable of immunizing rabbits against the effects of homologous toxin. MYCOTIC STOMATITIS was diagnosed in a herd of 200 cattle and caused a 25% mortality. Mineral tolerance tests in rats were carried out with natural shallow-well water which is highly mineralized. The feeding by force of 20 lambs for 190 days with three different mineral supplements [no details] failed to cause URINARY LITHIASIS. Copper-nicotine solution was found to have some anthelmintic effect against the fringed tapeworm. 10% derris-sulphur dust was effective against two cattle lice—*Trichodectes bovis* and *Haematopinus eurysternus*.

DELAWARE, 1942–43.—A project to tabulate poultry mortality data is outlined.

GEORGIA, 1942–43.—The locally important nodular worm of sheep is now satisfactorily controlled by phenothiazine, and copper sulphate and nicotine sulphate are used in the summer against "tapeworm". The creosote dipping method for controlling sheep lice (*Trichodectes ovis*) is described. Sodium fluoride powder may be used alternatively. Artificial insemination is in use.

GEORGIA (COASTAL PLAIN), 1942–43.—In discussions on the raising of cattle and pigs, reference is made to sources of minerals which are locally available and to the adequacy of local forage crops.

KENTUCKY, 1942.—Considerable identification work was carried out on Salmonella strains and *S. berta*, not previously isolated in the U.S.A., was recovered from a man who had eaten sausage. *S. pullorum* was recovered from a case of mild enteritis in man. A large quantity of *S. abortus-equi* vaccine was produced. Casuistic data on the abortion history of mares vaccinated with a tissue vaccine prepared from the livers of aborted foetuses are given in connexion with so-called VIRUS ABORTION. Vaccination appeared to be of some value. Inconclusive observations are recorded on PERIODIC OPHTHALMIA and WOBBLES (INCOORDINATION) in horses. Three types of bone disease in fowls are described—PEROSIS, OSTEOPETROSIS and a cancerous or tumourous condition: they are not rare in the state.

Causes of mortality in Kentucky sheep are discussed; HELMINTHIASES is most important. The inefficacy of phenothiazine against the actual nodules of nodular worm disease is mentioned. Diethylstilboestrol in cottonseed oil rubbed into the skin of the udder of a Jersey heifer 16 months old caused violent oestrus and mammary development with milk secretion.

MARYLAND, 1941–42.—The BOVINE MASTITIS problem is discussed. Colloidal silver oxide and gramicidin are said to be the best remedies for the streptococcal type. Records of 2,000 cattle vaccinated as calves with strain 19 vaccine against BRUCELLOSIS show that about 5% retain a positive reaction for as long as 12 months and a further 16% a suspicious reaction. This interferes with the accredited herd plan wherein no reacting animal may be retained after reaching two years of age. The intradermal injection of the "standard vaccine" does not cause long-lasting reactions and may give better results. Evidence that the agglutination test for PORCINE BRUCELLOSIS is not accurate enough, was obtained through laboratory and field work. General investigational work on BOVINE TRICHOMONIASIS is in course. It is said that GIZZARD EROSIONS occur in 75% of all chicks and that oats, bran or alfalfa leaf meal cure them. Several nutritional investigations are mentioned.

MISSISSIPPI, 1941–42.—A few mineral and vitamin feeding trials to cattle are described: the work continues.

NEW MEXICO, 1942–43.—Studies on vitamin A content of local herbage were carried out with cattle, goats and rats but are still in an early stage.

NEW JERSEY, 1941–42.—This report consists of studied answers to set questions such as might be asked by farmers. There is no new information of veterinary interest.

NORTH CAROLINA, 1942.—PARATYPHOID in turkeys is prevalent in the state and is caused by *Salmonella typhi-murium*; control is on hygienic lines. It is claimed that resistance to AVIAN COCCIDIOSIS has been raised by selective breeding over two generations. An attempt is being made to produce a vaccine against AVIAN CORYZA (*Haemophilus gallinarum*). TAPEWORM INFESTATION [no details] in chickens is a problem of local importance and is being tackled by management means. A few dietetic matters are referred to.

OREGON, 1938–40.—Livestock diseases mentioned include PULPY KIDNEY DISEASE, "BLACK" DISEASE, STIFF LAMB DISEASE and CHRONIC PNEUMONIA in sheep, CASEOUS LYMPHADINITIS in goats, LIVER ROT in cattle and sheep, and "FERN" POISONING. No new scientific information emerges. Several nutritional investigations are also referred to. New turkey diseases diagnosed in the state include *Hexamita* infection, SWINE ERYSIPELAS infection and PARATYPHOID caused by *Salmonella bareilly*, *S. oranienburg*, *S. derby*, *S. montevideo*, *S. muenchen*, *S. typhi-murium* and *S. senftenberg*. A 4% solution of silver nitrate was found to be effective in INFECTIOUS SINUSITIS in turkeys. The coccidia *Eimeria acervulina* and *E. mitis*, when fed to chickens in very large doses of oocysts, were found to cause loss of body weight and egg production, but no deaths. INFECTIOUS LARYNGOTRACHEITIS was diagnosed in the state for the first time.

PENNSYLVANIA, 1942–43.—MASTITIS has been

eradicated from the station herd by a practice of monthly bacteriological tests and the elimination of cows with infected milk. Data on losses from FOWL PARALYSIS are given. CALF SCOURS has been cured by sulphasuxidine or sulphaguanidine in a very high percentage of cases and sulphapyridine, sulphathiazole and sulphadiazine have all been used with success in CALF PNEUMONIA. The superiority of phenothiazine to other anthelmintics for sheep is referred to. A mixture of 1 part phenothiazine to 9 parts salt was found effective in controlling mild or moderate WORM INFESTATION.

SOUTH DAKOTA, 1941–42.—Sodium arsenite given in a salt mixture (25 p.p.m.) increased the resistance of cattle to SELENIUM POISONING and led to an increase in weight. In fowls, ground flax seed and pressed linseed oil meal protected against the toxic action of seleniferous rations. Inconclusive results were obtained with arsenic. The cause of OAT HAY POISONING was being investigated. Chenopodium foliage added to the ration of lambs is said to have given good anthelmintic results. From investigations into the cause of death in BLOAT in cattle hydrogen sulphide appeared to be the lethal agent. The health-promoting effect of sunshine on cows was studied and verified.

VERMONT, 1942–43.—Notes on the progress of artificial insemination are given. The effect is being studied of feeding pooled colostrum milk to calves for various periods.

WASHINGTON, 1942–43.—The accuracy of the electrometric mastitis detector, previously described, was further checked and verified. In studies on FOWL LEUCOSIS it was observed that depressed red blood corpuscle counts occur during the first few days of life. The feeding of liver meal to day-old chicks had no influence. The efficacy of phenothiazine and other drugs against ROUND WORMS of poultry is said to have been increased by the addition of amphetamine sulphate. In research on the potential toxic effects of orchard tree spray residues to animals, study was begun on the fate of lead and arsenic in the body of pigs. Chemical work to find the toxic principle in tarweed (*Amsinckia intermedia*) seeds was undertaken.

WISCONSIN, 1942–43. (Part I).—Unsatisfactory therapeutic results in MASTITIS have been obtained with colloidal silver in mineral oil, sulphathiazole and urea in propylene glycol, and sulphanilamide in mineral oil. Sulphadiazine is an effective cure of AVIAN COCCIDIOSIS, but too expensive for wide use. Vitamins A and C, given during the first 10 days of life, have been found beneficial in the prevention of CALF SCOURS. Vitamin C also favours conception in cows, and another type of infertility responds to hormone therapy (pituitary extract). A comparison of the health and productivity of cows kept in a warm stall byre and in a "cold pen" byre where they were not confined in stanchions is described. Each method had its advantages and neither can be recommended to the exclusion of the other. The cold pen method involves the treading of straw and infrequent removal of the resulting straw manure. Types of inherited defects in three breeds of swine are briefly described.—J. E.

U.S.A. MICHIGAN. (1943.) **Eighty-Second Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan and Fifty-Sixth Annual Report of the Experiment Station from July 1, 1942 to June 30, 1943.** pp. 197. Items of veterinary interest pp. 94–95, 171 & 193–194. Lansing, Michigan. 8vo. **2481**

In a brief report by the Dean of Veterinary Science [GILTNER, W.], the total number of veterinary students enrolled in the Michigan veterinary school is given as 296. 65 new students were admitted during the year and 54 graduated.

It is estimated that 75% of the herds and 25% of the cows are infected with MASTITIS. BOVINE BRUCELLOSIS control in northern Michigan was carried out in 42 counties, of which 26 are accredited. 125,525 blood tests were made and 4·5% of these were positive. One outbreak of EQUINE ENCEPHALOMYELITIS occurred; it was due to the Eastern virus which has not previously been detected in Michigan. Horse parasite control work has dwindled about three-fold since 1936.

A few remarks on poultry pathology work are made.
—J. E.

BOOK REVIEW

KUBES, V. [D.M.V., Director del Instituto de Investigaciones Veterinarias, Caracas.] (1944.) El "Trypanosoma vivax" Americano agente de la tripanosomiasis bovina en Venezuela. Su comparación con el del Africa. **[The American strain of *Trypanosoma vivax*, the causal organism of bovine trypanosomiasis in Venezuela. Comparison with the African strain.]** pp. 126. 20 figs. Caracas: Editorial Grafolit. 8vo. [English summary.] **2482**

The danger of establishing disease in an area which may appear to be unsuitable for it is well illustrated in this publication, which covers the history and distribution of *T. vivax* in America and investigations carried out in Venezuela, comparing the American strain with the African one in respect of morphology, cultivability and pathogenicity.

T. vivax was discovered by Ziemann in Africa where it is transmitted cyclically by species of *Glossina*, though it can be transmitted mechanically by other biting flies. In America it was first recorded in French Guiana in 1919, and has since been encountered in Guadeloupe, Martinique, Colombia, Venezuela and Panama. It is believed that the infection was introduced from Africa, but conclusive evidence of this is lacking. In spite of the absence of tsetse flies, it appears to be spreading in America, and it has retained its main characteristics for 25 years. No information is available as to the method of transmission in America. The investigations now recorded show that the American strain agrees closely with *T. vivax* of Africa in morphology, pathogenicity, and cultivability, cultivation being unsuccessful even in the developing chick embryo. It is suggested that where successful culture of *T. vivax* has been claimed, *T. theileri* may have been involved. The American strain has little pathogenicity to well nourished cattle, but may kill up to 50% of animals in poor condition. It is also infective to goats, sheep, horses, asses, and swine, but causes little or no clinical reaction in the last three. Cattle may harbour the parasite for at least ten months, but with recovery an immunity is established which persists for some months, even in cases where chemotherapy is applied, as long as treatment is not started too soon after infection. [Little immunity is conferred by African strains.]

Tartar emetic and antimosan have a limited value in treatment, but it is claimed that a single dose of 2·5 ml. per kg. body weight of a quinoline compound, "Bayer 7602", is curative in cattle, eight animals having been treated successfully.—U. F. RICHARDSON.

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